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A taxonomic review, including new species and new records of Philippine Obrimini stick insects (Insecta: Phasmatodea: Heteropterygidae: Obriminae)

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Abstract. – A taxonomic study of the Philippine stick insects that belong in the subfamily Obriminae (family Heteropterygidae) is conducted and has yielded a considerable number of new synonyms and new species, that broaden our knowledge and represent a considerable step towards the inter- and intrageneric arrangement of this striking and polarising clade. In this matter, the genera *Brasidas* Rehn & Rehn, 1939, *Eubulides* Stål, 1877, *Euobrimus* Rehn & Rehn, 1939, *Mearnsiana* Rehn & Rehn, 1939, *Obrimus* Stål, 1875, *Stenobrimus* Redtenbacher, 1906, *Theramenes* Stål, 1877 and *Trachyaretaon* Rehn & Rehn, 1939 are reviewed in taxonomic and morphological aspect. The species contained in each genus are reorganised and identification keys are provided where appropriate. New records and information on the geographic distributions, as well as notes on the intraspecific variability of almost all concerned species are presented. The genus *Euobrimus* Rehn & Rehn, 1939 is synonymised with *Brasidas* Rehn & Rehn, 1939 (**n**. **syn**.), a synonymy that has already been proposed previously based on both morphological and molecular data. Therefore, all species contained in *Euobrimus* are automatically transferred to *Brasidas* with the exception of *Euobrimus quadratipes* (Bolívar, 1890), which is reinstated in its original genus *Obrimus* Stål, 1875.

Nine new synonymies are revealed. The identity and synonymies of *Brasidasa lacerta* (Redtenbacher, 1906) **n**. **comb**., an endemic of the island of Mindanao, are clarified with six species and one subspecies synonymised with *B. lacerta*: *Brasidas acanthoderus* Rehn & Rehn, 1939; *Brasidas foveolatus* asper Rehn & Rehn, 1929; *Brasidas montivagus* Rehn & Rehn, 1939; *Euobrimus atherura* Rehn & Rehn, 1939; *Euobrimus cleggi* Rehn & Rehn, 1939; *Euobrimus dohrni* Rehn & Rehn, 1939; and *Euobrimus stephenreyesi* Lit & Eusebio, 2006 (**n**. **syn**.). The remarkable intraspecific variability of *B. lacerta* is discussed to support the new synonymies here introduced. Moreover, *Euobrimus hoplites* Rehn & Rehn, 1939 is shown to be a synonym of *Brasidas bakeri* (Rehn & Rehn, 1939) **n**. **comb**. (**n**. **syn**.) and *Trachyaretaon brueckneri* Hennemann & Conle, 2006 is synonymised with *Trachyaretaon carmelae* Lit & Eusebio, 2005 (**n**. **syn**.). Lectotypes are designated for *Phasma (Acanthoderus) bufo* Westwood, 1848, *Obrimus lacerta* Redtenbacher, 1906 and *Euobrimus dohrni* Rehn & Rehn, 1939 in order to provide stability of the concerned taxa.

Eighteen new species and one new genus are described. Four new species are described in the genus *Brasidas* Rehn & Rehn, 1939: *B. waray* **n**. **sp**. from the island of Leyte is described solely from a unique female with the male and egg still unknown, *B. malaki* **n**. **sp**. is described from a unique male from the island of Leyte, *B. manobo* **n**. **sp**. from Mindanao and *B. rehni* **n**. **sp**. from the small island of Siargao is described from the male and female. Four new species are decribed in the genus *Eubulides* Stål, 1877: *E. blaan* **n**. **sp**. from Mindanao is described from both sexes and the eggs, the Mindanaon *E. constanti* **n**. **sp**. is described from a unique male, and the two morphologically very similar *Eubulides timog* **n**. **sp**. and *Eubulides lumawigi* **n**. **sp**. from the island of Luzon are described from both sexes but only the egg of the first species is known and described. The previously monotypic genus *Mearnsiana* Rehn & Rehn, 1939 is endemic to Mindanao and enhanced by the description of *M. maranao* **n**. **sp**., a species that is only known from a unique male. The previously monotypic genus *Sungaya* Zompro, 1996 is endemic to the island of Luzon and enriched by the descriptions of three new species: the two morphologically very close *S. aeta* **n**. **sp**. and *S. ibaloi* **n**. **sp**. are described from both sexes and the egg and the rather distinctive *S. dumagat* **n**. **sp**. is only known from a unique female. Six new species are described in the genus *Trachyaretaon* Reh & Rehn, 1939: *T. maliit* **n**. **sp**. from Luzon is the smallest known representative of the genus and described from the male and female, *T. mangyan* **n**. **sp**. from Mindoro Island, *Trachyaretaon negrosanon* **n**. **sp**. from the island of Negros, *T. tumandok* **n**. **sp**. from Panay Island and the two morphologically very similar *T. bresseeli* **n**. **sp**. and *T. nakatago* **n**. **sp**. from the island of Luzon are described from both sexes and the eggs. The new genus *Armadolides* **n**. **gen**. is described for comprising solely its distinctive type species *A. manaobo* (Acola *et al*., 2022) **n**. **comb**. from Mindanao, which is here transferred from the genus *Eubulides*. The holotypes of all newly described species are deposited in the collection of Institute Royal des Sciences Naturelles de Belgique, Bruxelles (RBINS) with the exception of *Brasidas rehni* **n**. **sp**. whose holotype is housed in the collection of the Academy of Natural Sciences, Philadelphia (ANSP).

The previously unknown male and egg of *Obrimus bufo* (Westwood, 1848) and the egg of *Trachyaretaon echinatus* (Stål, 1877) are described and illustrated for the first time and the first illustrations are provided of the unknown adult female of *Obrimus uichancoi* Rehn & Rehn, 1939, which was previously only known from immature specimens. The egg of *Brasidas bakeri* (Rehn & Rehn, 1939) is described and illustrated for the first time. Illustrations are provided for the eggs of *Aretaon*

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asperrimus (Redtenbacher, 1906), *Brasidas cavernosus* (Stål, 1877) **n. comb.**, *Brasidas lacerta* (Redtenbacher, 1908) **n. comb.**, *Brasidas samarensis* Rehn & Rehn, 1939, *Mearnsiana bullosa* Rehn & Rehn, 1939, *Obrimus bicolanus* Redtenbacher, 1908, *Trachyaretaon carmelae* Lit & Eusebio, 2005 and *Theramenes exiguus* Hennemann & Conle, 2003.

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Keywords. – Phasmida, *Areolatae*, Obriminae, *Aretaon*, *Armadolides* **n. gen.**, *Brasidas*, *Eubulides*, *Euobrimus*, *Mearnsiana*, *Stenobrimus*, *Sungaya*, *Trachyaretaon*, new genus, new species, new synonyms, keys, descriptions, Philippine, lectotypes.

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Introduction

Considerable efforts have been made in the past twenty years to re-arrange the taxonomy and reveal the natural relationships within Old World stick and leaf insects (Phasmatodea). Attempts have included morphological approaches (e. g. Bradler, 2001; Hennemann & Conle, 2008; Hennemann *et al.*, 2009, Hennemann *et al.*, 2016), cladistic analyses of morphological data (e. g. Tilgner, 2002; Bradler, 2009) as well as molecular-based phylogenetic studies (e. g. Whiting *et al.*, 2003; Buckley *et al.*, 2010; Bradler *et al.*, 2015; Robertson *et al.*, 2018; Simon *et al.*, 2019; Bank *et al.*, 2021). Although the traditional classification originally introduced by Günther (1953) gained broad acceptance by subsequent authors (e. g. Bradley & Galil, 1977; Kevan, 1977; Kevan, 1982) the order was more recently considered to be lacking a phylogenetically based classification (Bradler & Buckley, 2018). Many of the results obtained by recent studies did not corroborate the traditional classification proposed by Günther (1953) and since then many inaccuracies have been uncovered and clarified, these being important steps towards a natural classification. However, up to date still a good number of relationships within the Old World Phasmatodea remain questionable and although there is a good amount of conformity there are noteworthy discrepancies between the results of morphological and molecular data. One such case is the family Heteropterygidae, which since its official introduction as Heteropteryginae by Kirby (1896) has experienced various disaccording taxonomic arrangements (e. g. Redtenbacher, 1906; Rehn & Rehn, 1939; Günther, 1953; Beier, 1968; Klante, 1976; Bradley & Galil, 1977; Zompro, 2004; Hennemann *et al.,* 2016; Bank *et al.,* 2021).

The Heteropterygidae are a clade of Oriental stick insects that comprises broad-bodied and often strikingly spinose Phasmatodea that range in size from very small (e. g. genus *Planispectrum* Rehn & Rehn, 1939, subfamily Dataminae) but also contain the well-known large Jungle Nymph *Heteropteryx dilatata* (Parkinson, 1798), one of the heaviest insects worldwide with a body weight of over 50 g (Wood, 1976; Beccaloni, 2010; Hennemann *et al.,* 2016). Due to their remarkable looks, interesting habits, impressive defensive behaviours of members of the Heteropteryginae subfamily in particular, and the fact that most species are fairly easy to culture this clade has received particular attention during the past decades. Moreover, the Heteropterygidae have recently been subject to two comprehensive and in-depth studies that aimed at clarification of the taxonomy and phylogeny of the clade, i. e. a morphological approach that also taxonomically revised the Heteropteryginae at the species-level (Hennemann *et al.*, 2016) and a molecular study (Bank *et al.*, 2021). Although, these two studies largely match in the basic arrangement of the major subgroups of Heteropterygidae and corroborate each other, there is some disagreement in the evaluation of singe taxa especially within the subfamily Obriminae. Both studies however point out and agree in that there are still numerous inaccuracies within the current inter- and intrageneric arrangement of the *Obriminae* in particular.

The present work studies the Philippine genera of Obriminae: Obrimini in a more conclusive manner and provides clarifications of several inaccuracies along with numerous taxonomic amendments. This is rendered by the recent availability of rich material mostly in the personal collection of the author from throughout the complex geography of the Philippine Islands. During the process of taxonomic evaluation and identification, it became clear that this material, which comprises good series of various species, could help solve many of the taxonomic ambiguities, some of which have already been pointed out previously (Hennemann *et al.*, 2016; Bank *et al.*, 2021). A comprehensive study of the Philippine Obriminae was published Rehn & Rehn (1939), which described a number of new taxa from the Philippine Islands and presented a re-arrangement of the subfamily. Although this work was superbly and accurately executed in the typical manner of the first author James A.G. Rehn and undoubtedly represents a major step towards our knowledge of this clade, the study unfortunately suffered from the fact that several of the new species, and even one genus, were described from immature specimens. This, in combination with lack of knowledge of intraspecific variability and often remarkable differences between juvenile and adult insects of individual species in various morphological aspects, including the development of the head and body supination, have resulted in various inaccuracies, misinterpretations of taxa and the description of several synonyms. Aside from that, the work by Rehn & Rehn (1939) introduced ‘acanthotaxy’ to uniformly describe the major spines of the head and body of Obriminae. Acknowledging the practicality of this acanthotaxy and in aspect of the general homology, it has subsequently been modified for the use in the other subordinate taxa of the Heteropterygidae, namely Dataminae (Bragg 1998; Bragg 2001) and Heteropteryginae (Hennemann *et al.*, 2016).

Biogeography

Some basic information on the highly complex geology and geography of the Philippine Islands archipelago and its biogeographic regions may be presented here for better understanding the distributional patterns of the taxa discussed herein.

The Philippines is an oceanic archipelago in the western Pacific Ocean composed of over 7.600 islands that are broadly categorized under the three main geographic divisions Luzon in the north, Visayas in the centre and Mindanao in the south (Fig. 1). The archipelago covers a total area of around 300.000 km^2 and is bounded by the South China Sea to the west, the Philippine Sea to the east, and the Celebes Seas to the south. The eleven largest islands are Luzon, Mindanao, Samar, Negros, Palawan, Panay, Mindoro, Leyte, Cebu, Bohol and Masbate, which together comprise about

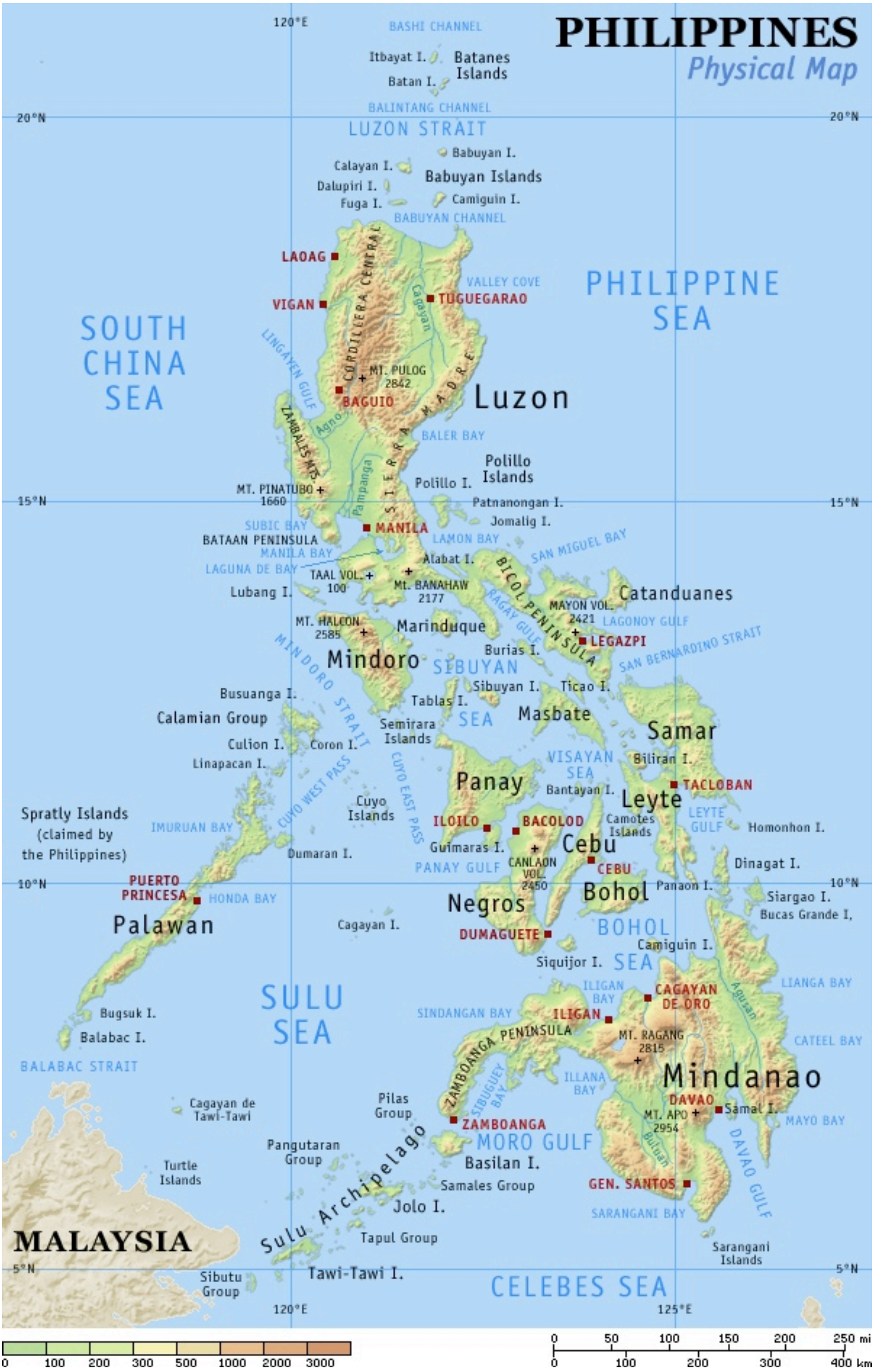

Fig. **1**. Physical map of the Philippine Islands, showing all the main islands (Source: Wikipedia Commons. © Eugene Alvin Villar; https://upload.wikimedia.org/wikipedia/commons/6/6f/Ph_physical_map.png)

95% of the archipelago's total land area (Chaffee, 1969: 6). Since the Philippines are situated on the western fringes of the Pacific Ring of Fire, the archipelago experiences frequent seismic and volcanic activity. The highest mountain is the volcano Mount Apo at 2.954 m on the island of Mindanao and in addition this this, there are 22 further active volcanoes among which are Mount Mayon, Mount Bulusan and Mount Taal on Luzon and Mount Canlaon on the island of Negros. The geographic and geological complexity and large area represent close to the optimum conditions for a high biodiversity and thus, the Philippines are one of the 17 world's megadiverse countries (Williams *et al*., 2001) and harbour among the highest rates of endemism in the world.

Despite its largely unique fauna (Heaney *et al.,* 2005), the Philippines have long been regarded as a distinct biogeographic entity (e. g. Cox, 2001) but more recent studies have revealed that the Philippines need to be regarded as part of Wallacea (e. g. Vallejo, 2011). Also, the phasmatodean fauna of the Philippines shows close relations to that of the rest of Wallacea, which is seen in numerous genera that are shared with either Sulawesi or the Maluku islands (Bresseel & Constant, 2017; Hennemann, 2021). On the other hand, a good number of genera are shared with Borneo and Sundaland. However, any broader analysis of the Philippine phasmid fauna would still be premature and warrants a much better exploration and understanding of the Philippine Phasmatodea.

The Philippines have never been connected to any of the other Asian landmasses during their geological history. This isolation from the rest of Asia allowed this archipelago to develop a unique flora and fauna, thus explaining its staggering levels of endemism. Moreover, many species are not only endemic to the Philippines but unique to individual Philippine islands. As many as 44% of its vertebrate species and almost 70% of its insect species are not found anywhere else in the world (Sinha & Heaney, 2006). Among the world's 25 top biological hotspots the Philippines ranks second in the number of species per km2, which means that the endemic species are concentrated in exceptionally small areas (*Myers et al.,* 2000). During glacial events, five major Pleistocene island-groups developed: Greater Luzon (composed of Luzon, Catanduanes, Marinduque and Polillo), Greater Mindanao (Mindanao, Bohol, Leyte, Samar and Basilan); Greater Negros-Panay (Cebu, Masbate, Negros and Panay), Greater Sulu (Tawi-Tawi and the Sulu Islands), and Greater Palawan. Principally, these Pleistocene island-groups reflect the currently recognized biogeographic regions of the Philippines. With the exception of Palawan, which became contiguous with Borneo when sea-level dropped repeatedly during the Pleistocene, none of the over 7.000 islands of the Philippines have ever been connected to one another nor to any other Asian landmass. Even the islands of Mindoro, Sibuyan, Camiguin, and Siquijor have remained isolated from any of the larger islands (Heaney & Regalado 1998; Sinha & Heaney 2006), thus it is not surprising that each of these Pleistocene islands harbours endemic species. Even the small solitary island of Sibuyan, which has an area of less than 500 km^2, has its own impressive array of endemic species, although it is only a few kilometres away from Luzon. Other islands, such as Negros and Panay, share a considerable number of faunal species, which however are different from those of other adjacent Visayan islands such as Leyte and Samar. The fauna of Leyte and Samar, in turn show closer relationship to Mindanao and the fauna of Masbate is more related to that of Negros and Panay rather than the more nearby Luzon. These interesting patterns were observed in various terrestrial vertebrates including birds (Peterson *et al*., 2000), amphibians (Evans *et al.,* 2003), mammals (e. g. Heaney & Regalado, 1998; Steppan *et al*., 2003; Roberts, 2006; Esselstyn & Brown 2009) and reptiles (McGuire & Heang, 2001).

Material and Methods

All specimens examined for this study are invariably dried and pinned. Insects and eggs were examined using magnifying glasses with 4x and 10x magnification and a Russian MBC-10 binocular microscope. Measurements of specimens and eggs were made to the nearest 0.1 mm using digital calipers. Photos of specimens were taken with a Nikon D7000 camera equipped with a Nikon DX AF-S Macro 40 mm lens and a wireless Nikon SU-800 dual speed light system. For details of insects a Raynox® DCE250 lens was used and background lightning was provided by a 18W 6000K LED panel light plate. Photo stacking was conducted with a Helicon® FB tube and the corresponding Helicon® focus stacking software. Photo editing was made with CorelDRAW® Graphic Suite 2021. The terminology and abbreviations used for naming and marking of morphological parts of the genitalia, head and thorax of the insects follows Beier (1968) and Bradler (2009). The terminology used for the spination and armature of the insects follows the acanthotaxy introduced for the subfamily Obriminae by Rehn & Rehn (1939). The terminology used to describe external and internal egg structures is that of Clark-Sellick (1997).

Abbreviations

ANSP: Academy of Natural Sciences, Philadelphia, Pennsylvania / U.S.A.
CMZ: Central Mindanao University, Center for Biodiversity Research and Extension, Mindanao / Philippines.
MCZC: Museum of Comparative Zoology, Harvard University, Cambridge / U.S.A.
MHNG: Museum d´Histoire Naturelle, Geneve / Switzerland.
MNHN: Museum National d´Histoire Naturelle, Paris / France.
MNHU: Museum für Naturkunde der Humboldt-Universität, Berlin / Germany.
MNMS: Museo Nacional de Ciencias Naturales, Madrid / Spain.
NHMUK: Natural History Museum, London / U.K.
NHMM: Natural History Museum, Maastricht / Netherlands.
NHMW: Naturhistorisches Museum, Vienna /Austria.
RBINS: Institute Royal des Sciences Naturelles de Belgique, Bruxelles / Belgium.
UMO: University Museum, Hope Entomological Collections, Oxford / U.K.
UPLB: Museum of Natural History, University of the Philippines, Los Baños / Philippines.
USNM: United States National Museum of Natural History, Washington D.C. / U.S.A.
ZMPA: Polish Academy of Sciences, Warszawa / Poland.
ZMUH: Zoologisches Museum und Institut, Hamburg / Germany.
ZSMC: Zoologische Staatsammlung München, Munich / Germany.
FH: Private collection of Frank Hennemann, Freinsheim / Germany.
OC: Private collection of Oskar V. Conle, Duisburg / Germany.
OZ: Private collection of Oliver Zompro (Berlin) / Germany.
HT: Holotype
AT: Allotype
PT: Paratype
ST: Syntype
LT: Lectotype
PLT: Paralectotype

Subfamily
Obriminae Brunner v. Wattenwyl, 1893

Type-genus. – *Obrimus* Stål, 1875b: 49.

Remarks. – The Obriminae was first recognized by Brunner v. Wattenwyl (1893) as Obrimi. Rehn & Rehn (1939) subdivided the Obriminae into the two tribes, Obrimini and Datamini and Günther (1953: 551) placed these two tribes along with Heteropterygini in the subfamily Heteropteryginae. Zompro (2004) raised Heteropteryginae to family level and the tribes contained to subfamily level. This basic arrangement has since been retained with the monophyly of Heteropterygidae and its three subordinate clades supported by various studies using molecular data (Bradler *et al.*, 2015; Goldberg *et al.*, 2015; Robertson *et al.*, 2018; Büscher *et al.*, 2018; Glaw *et al.*, 2019; Simon *et al.*, 2019; Bank *et al.*, 2021) but also by an approach based on morphological data (Hennemann *et al.*, 2016). However, the phylogenetic relationships between the three clades Dataminae, Heteropteryginae and Obriminae has been variable among the abovementioned studies, but the two studies that exclusively dealt with the Heteropteryginae (Hennemann *et al.*, 2016; Bank *et al.*, 2021) agree in that the small and entirely wingless Dataminae are the sister group of Heteropteryginae + Obriminae, which are characteristic for a spinose area apicalis and ♀ having a beak-like secondary ovipositor that renders an egg-deposition mode in which the eggs are buried in soil. However, even in these two studies there is noteworthy disagreement in the arrangement of the subordinate taxa of Obriminae.

The subfamily Obriminae was subdivided into three tribes by Zompro (2004: 201), the Obrimini, Eubulidini and Miroceramiini. This subdivision was rejected by Hennemann *et al.* (2016), who proposed a subdivision into the Miroceramiini (solely comprising the winged Wallacean genus *Miroceramia*), Tisamenini (containing *Tisamenus*, *Ilocano*, *Pterobrimus* and *Hoploclonia*) and Obrimini (containing all remaining genera of Obriminae). While the relationships proposed on the basis of morphological characters are basically reflected by the molecular approach by Bank *et al.* (2021), the resulting topology within Obriminae is different and refutes all previously established tribes. In contrast to preceding arrangements this study only recognizes two tribes within Obriminae, the Hoplocloniini (only containing *Hoploclonia* Stål, 1875) and the Obrimini (comprising all other genera of Obriminae). While Hennemann *et al.* (2016) interpreted the differently structured secondary ovipositor of ♀ of *Hoploclonia*, in which the upper portion is alternatively formed by elongation of the anal segment (= abdominal tergum X) instead of an elongated epiproct like in all other Obriminae (and Heteropteryginae), as a reduced ancestral and newly evolved type of ovipositor, molecular data reveal *Hoploclonia* as sister to all remaining Obriminae and suggest the secondary ovipositor to have been evolved three times independently within the Heteropterygidae. Moreover, molecular data have revealed *Pterobrimus*, the only genus of Obriminae that occurs in Fiji in the Pacific Ocean, to be sister to the winged *Miroceramia* and *Miroceramia* + *Pterobrimus* to be sister group to all other predominantly Philippine Obrimini (Bank *et al.*, 2021). The tribe Tisamenini *sensu* Hennemann *et al.* (2016) was also refuted as being polyphyletic by molecular data because *Hoploclonia* has resulted as sister to all remaining Obriminae and *Pterobrimus* was recovered as sister to *Miroceramia*. Surprisingly, molecular data suggest the striking *Theramenes* as sister to *Tisamenus* (and the synonymous *Ilocano*). From morphological aspects however there is no support for such an assumption because both genera are well recognized by unique morphological characters that (i) readily separate them from all other Obriminae and (ii) distinguish both genera from another. No synapomorphies have so far been found that would support a sister group relationship between *Theramenes* and *Tisamenus*. Thus, and despite the high UFBoot support value (99) for this topology, the result concerning the relationship between these two genera must still be regarded as doubtful and deserves further evaluation. In general, it is noteworthy that there is little to no morphological support for *Eubulides* as nested within a complex that comprises *Aretaon*, *Trachyaretaon* and *Sungaya* and as sister to *Trachyaretaon* + *Sungaya*. The genera *Aretaon*, *Trachyaretaon* and *Sungaya* share several common characters, such as the conically raised vertex, presence of distinct and often composite posterior mesonotal and metanotal spines and an ovipositor in ♀ that is straight if seen in lateral aspect, whereas the head is strikingly flattened, the body armature noticeably reduced, the posterior mesonotals and metanotals are completely missing and the ovipositor of ♀ is distinctly up-curved in *Eubulides*. Hennemann et al. (2016) have therefore suggested close relation of *Eubulides* with *Heterocopus*, *Mearnsiana* and *Theramenes* and placed these four genera in the *Theramenes*-group among Obrimini.

A comprehensive study of the Philippine Obriminae was published by Rehn & Rehn (1939), which described five new genera and a new subgenus as well as 24 new species and one new subspecies. Further new taxa were described by Zompro (1996b), Hennemann & Conle, (2003, 2006), Lit & Eusebio (2005a, 2005b, 2006), Lit (2010), Acola *et al.* (2022) and Hennemann (2023), but these papers mostly restricted to describing new taxa. Only few papers have dealt with described taxa (e. g. Lit & Eusebio, 2008b; Seidenschwarz, 2018, Acola *et al.*, 2022) but there is a plethora of papers that reported on various aspects of Obriminae stick insects, described previously unknown sexes or eggs and provided notes on captive breeding (e. g. Zompro, 1996a; Lit & Eusebio, 2008b; Dräger, 2012, 2013, 2014; Baker, 2015). Rehn & Rehn (1939) unfortunately described several of their new species and even one genus (*Mearnsiana*) merely from immature specimens, without knowledge of the striking differences between the development of the head and body armature between immature and mature insects of individual species. These authors lacked knowledge of the remarkable intraspecific variability that occasionally occurs, particularly in the spination of the head and body, which were the main characters that Rehn & Rehn consulted for distinguishing between the species. Almost all species were known to Rehn & Rehn by only a limited number of examples or even unique specimens, which of course hindered any conclusions that considered this important issue of the obrimoid morphology. This lack of important information has in part caused the description of several synonymic species not only by Rehn & Rehn (1939) but also by subsequent authors, nine of which are revealed herein. For the same reasons, the available keys to the species of Obriminae genera presented by Rehn & Rehn, that mostly rely on characters of the head and body spination, are only of restricted use. While the nine synonymies uncovered in the present study considerably lowers the known diversity of Obriminae, this is compensated for by the description of 18 new species in the genera *Brasidas*, *Eubulides, Mearnsiana* and *Trachyaretaon*.

Distribution. – Philippines, Palawan, Borneo, Talaud Islands, Wallacea, Palau Islands and Fiji.

Tribe
Obrimini Brunner v. Wattenwyl, 1893

Type-genus. – *Obrimus* Stål, 1875b: 49.

Remarks. – Obrimini is here reflected as arranged by Bank *et al.* (2021). Besides the non-Philippine genera *Heterocopus Miroceramia* and *Pterobrimus*, the only Philippine obrimine genera not studied herein are *Theramenes* and *Tisamenus*. The first has recently been dealt with by Hennemann (2023) and the very distinctive and diverse latter genus deserves special and more detailed treatment on its own and shall be subject to a future study.

Distribution. – Philippines, Palawan, Borneo, Wallacea (N-Sulawesi and Seram), with single representatives on the Talaud, the Palau Islands and Fiji.

Genera included.

The three genera marked with an asterisk (*) are not represented in the Philippines and excluded from the keys below.

1. *Aretaon* Rehn & Rehn, 1939: 419.
Type-species. – *Obrimus asperrimus* Redtenbacher, 1906: 41, by original designation.

2. *Armadolides* **n**. **gen**.
Type-species. – *Eubulides manobo* Acola et al., 2022: 7, by present designation.

3. *Brasidas* Rehn & Rehn, 1939: 430.
Type-species. – *Brasidas samarensis* Rehn & Rehn, 1939: 432, by original designation.
= *Euobrimus* Rehn & Rehn, 1939: 445. **n**. **syn**.
Type-species. – *Euobrimus atherura* Rehn & Rehn, 1939: 446, by original designation).

4. *Eubulides* Stål, 1877: 68.
Type-species. – *Eubulides alutaceus* Stål, 1875: 68, by monotypy.

5. *Heterocopus* Redtenbacher, 1906: 42. (*)
Type-species. – *Heterocopus leprosus* Redtenbacher, 1906: 42, by subsequent designation of Rehn & Rehn, 1939: 415.

6. *Mearnsiana* Rehn & Rehn, 1939: 458.
Type-species. – *Mearnsiana bullosa* Rehn & Rehn, 1939: 459, by original designation.
= *Hennobrimus* Conle, 2006: 44. [Synonymised by Hennemann *et al*., 2016: 18]
Type-species. – *Hennobrimus hennemanni* Conle, 2006: 45, by original designation.

7. *Miroceramia* Günther, 1934a: 283. (*)
Type-species. – *Miroceramia pterobrimus* Günther, 1934a: 283.
(= *Heteropteryx westwoodii* Bates, 1865: 345), by original designation.

8. *Obrimus* Stål, 1875b: 49.
Type-species. – *Phasma (Acanthoderus) bufo* Westwood, 1848: 77, by subsequent designation of Kirby, 1904: 398.

9. *Pterobrimus* Redtenbacher, 1906: 43. (*)
Type-species. – *Pterobrimus depressus* Redtenbacher, 1906: 43, by monotypy.

10. *Stenobrimus* Redtenbacher, 1906: 37.
Type-species. – *Stenobrimus bolivari* Redtenbacher, 1906: 37, by monotypy.

11 *Sungaya* Zompro, 1996: 450.
Type-species. – *Sungaya inexpectata* Zompro, 1996: 450, by original designation.

12. *Theramenes* Stål, 1875b: 46.
Type-species. – *Eurycantha olivacea* Westwood, 1859: 65, by monotypy.

13. *Tisamenus* Stål, 1875a: 50, 92.
Type-species. – *Tisamenus serratorius* Stål, 1875a: 92, by subsequent designation of Kirby, 1904: 399.
= *Ilocano* Rehn & Rehn, 1939: 460. [Synonymised by Bank et al., 2021: 14]
Type-species. – *Ilocano hebardi* Rehn & Rehn, 1939: 461, by original designation.

14. *Trachyaretaon* Rehn & Rehn, 1939: 422.
Type-species. – *Obrimus echinatus* Stål, 1877: 68, by original designation.

Genus ***Aretaon*** Rehn & Rehn, 1939

Differentiation. –Distinguished from the exclusively Philippine *Trachyaretaon* Rehn & Rehn, 1939 by the lack of inter-posterior pronotal spines and anterior mesal metanotal spines as well as more distinct anterior mesonotals. Moreover, the vertex is much less convex and conical than in *Trachyaretaon* and rather flattened. The eggs differ by the broadened, angular and medially indented anterior end of the micropylar plate (narrow and rounded in *Trachyaretaon*).

Remarks. – The numerous citations of *Aretaon* may be referred to in the Phasmida Species File (Brock P.D., Büscher T. & Baker E. *Phasmida Species File Online*. Version 5.0/5.0. [17.10.2023]. http://Phasmida.SpeciesFile.org).

Distribution. – Borneo & Palawan

Species included

1. ***Aretaon asperrimus*** (Redtenbacher, 1906: 41, pl. 1: 4-5) [*Obrimus*].
Distribution. – Borneo & Palawan.

2. ***Aretaon muscosus*** (Redtenbacher, 1906: 41) [*Obrimus*].
Distribution. – Borneo

Aretaon asperrimus (Redtenbacher, 1906)

(Fig. 2-3, 71M, 72O & 74A-B)

Obrimus asperrimus Redtenbacher, 1906: 41, pl. 1: 4-5.

LT (by present designation), ♀: Coll. Br.v.W., Kina Balu, Borneo Staudinger; det. Redtenb. *Obrimus asperrimus*; 19.582 [NHMW, No. 37];

PLT, **2** ♀, **3** ♂: Coll. Br.v.W., Kina Balu, Borneo Staudinger; det. Redtenb. *Obrimus asperrimus* [NHMW, No. 37];

PLT, ♀: Kinabalu; *Obrimus asperrimus* Br., Kinabalu; *O. asperrimus* Redt., Brunn. Redt. det. [ZMAS];

PLT, **1** ♀, **4** ♂: *Obrimus asperrimus* Br., Kinabalu; Heyne 900.; 174. zo 178.; *Obrimus asperrimus* Redt., Brunn. Redt. det. [ZMAS];

PLT, ♂: Kina Balu Staudinger; *Obrimus asperrimus* Red.; Sintipo; MNCN Cat. N° 7632 [MNMS];

PLT, ♀: Kina Balu Staudinger; *Obrimus asperrimus* Red.; Sintipo; Cat. N° 7632 [MNMS];

PLT, ♂: Nord-Bornéo, Kina-Balu, collection Finot; MNHN-EO-PHAS1197 [MNHN];

PLT, ♀: Nord-Bornéo, Kina-Balu, collection Finot; MNHN-EO-PHAS1203 [MNHN];

PLT, ♂: Nord-Bornéo, Kina-Balu; Kinabalu, Borneo, 1500 m, H. Rolle Berlin; SW1L.; collection Finot; MNHN-EO-PHAS1200 [MNHN];

PLT, ♀: Nord-Bornéo, Kina-Balu; Kinabalu, Borneo, 1500 m, H. Rolle Berlin; SW1L.; collection Finot; MNHN-EO-PHAS1202 [MNHN].

Material examined

1 ♀: Philippines, Palawan, Municip. Quezon, Tau't Batu res., Singnapan Basin, XII/1990-I/1991, Pascal Lays leg. 200-300 m [RBINS];

5 ♀, **5** ♂, **2** eggs: Philippines, Palawan, Mt Gantung, ex culture 2010 [RBINS];

8 ♀, **8** eggs: Philippines, Palawan, Mt Gantung, ex culture 2010 [RBINS];

24 ♀, **24** ♂, **30** eggs: ex Zucht F. Hennemann 2012-2013, Herkunft: Palawan Mount Gantung 2009 [FH, No's 0118-42 to 90, E2].

Remarks. – This species was first recorded from Palawan by Zompro (2004: 214) based on a ♀ from Port Barton, Roxas. Culture stock has been introduced from two localities in Palawan and is since being successfully reared in captivity in Europe. Mostly due to striking chromatic differences if compared to typically coloured specimens from Mount Kinabalu, Borneo, both culture stocks have been referred to as "*Aretaon* sp. Palawan" and was added to the Phasmid Study Group culture-list as culture No. 329. Despite the different colouration morphological

Keys to the Philippine genera of Obrimini

♂

1. Mesonotum anteriorly with a raised trigonal area or at least two converging carinae or bulges, that form a trigonal area . . . . . ***Tisamenus***
— Mesonotum without a raised trigonal area or converging carinae or bulges **2**

2. Metasernum with pseudo-foramina **3**
— Metasternum simple, without pseudo-foramina **4**

3. Metasternal pseudo-foramina distinct semi-cingulate to cingulate open pits or holes near lateral margins of metasternum . . . . . ***Brasidas***
— Metasternal pseudo-foramina narrow slits at lateral margins of metasternum that appear like lateral invaginations; only Greater Luzon Biogeographic Region . . . . . ***Obrimus***

4. Meso- and metanotum with a large hump or wart-like posteromedian swelling; abdominal terga notably unequal in length (and shape in certain species); femora strongly incrassate . . . . . ***Theramenes***
— No posteromedian hump or swelling on meso- and metanotum; abdominal terga II-VI ± uniform in length and width; femora not unusually incrassate **5**

5. Very stocky and remarkably colourful insects; mesothorax at best ≤ 2x longer than prothorax; abdominal terga II-VII distinctly wider than long; tarsi > half the length of corresponding tibiae; only Mindanao . . . . . ***Mearnsiana***
— Slenderer and less colourful; mesothorax > 2.5x longer than prothorax; abdominal terga II-VII longer than wide; tarsi < half as long as corresponding tibiae **6**

6. Shape slender, elongate and stick-like; body roughly uniform in diameter; mesothorax > 3x longer than prothorax; head, thoracic nota and basal abdominal terga with paired spines . . . . . ***Stenobrimus***
— Stocky insects with body uneven in width; mesothorax widened posteriorly and < 3x longer than prothorax; armature of head, thoracic nota and abdominal terga different **7**

7. Vertex flattened and sub-cylindrical (at best weakly raised at posterior margin) **8**
— Head ovoid with vertex roundly convex to ± conically raised and tumescent **9**

8. Small (body length < 42.0 mm); meso- and metanotum with posterior meso- and metanotals; pronotum with a distinct median pair of spines; abdominal terga III-V with a large spiniform posteromedian protrusion; Mindanao . . . . . ***Armadolides* n. gen.**
— Body length > 42.0 mm; mposterior meso- and metanotals wanting; no median pair of spines on pronotum; abdominal terga unarmed . . . . . ***Eubulides***

9. Vertex sub-globose with vertex rounded; only Palawan . . . . . ***Aretaon***
— Vertex distinctly inflated to conically raised **10**

10. Stocky insects; mesothorax at best 2.5x longer than prothorax; mesonotum strongly widened in posterior portion and with widest part > 2x wider than anterior margin; metanotum with a pair of anterior mesal spines (may be indistinct) . . . . . ***Trachyaretaon***
— Slenderer insects; mesothorax > 2.5x longer than prothorax; mesonotum moderately widened posteriorly with widest part in posterior portion no more than 2x width of anterior margin; metanotum lacking anterior mesal spines; only Luzon . . . . . ***Sungaya***

♀

1. Mesonotum anteriorly with a raised trigonal area or at least two converging carinae or bulges, that forma trigonal area . . . . . ***Tisamenus***
— Mesonotum without a raised trigonal area or converging carinae or bulges **2**

2. Metasternum with pseudo-foramina **3**
— Metasternum simple, without pseudo-foramina. **4**

3. Metasternal pseudo-foramina distinct semi-cingulate to cingulate open pits or holes near lateral margins of metasternum . . . . . ***Brasidas***
— Metasternal pseudo-foramina narrow slits at lateral margins of metasternum that appear like lateral invaginations; only Greater Luzon Biogeographic Region . . . . . ***Obrimus***

4. Posterior meso- and metanotals reduced or wanting; ovipositor distinctly up-curved in lateral aspect **5**
— Posterior meso- and metanotals distinct, spinose and often composite; ovipositor straight or at beast weakly curved in profile **7**

5. Slender insects; head flattened and sub-cylindrical (at best slightly raised at posterior margin); mesothorax at best slightly widened posteriorly; vertex flattened; praeopercular organ arounded median pit some distance in front posterior margin of abdominal sternum VII **6**
— Stocky insects; head sub-globose; mesothorax prominently widening towards posterior and trapezoidal in dorsal aspect; vertex rounded; praeopercular organ different . . . . . ***Theramenes***

6. Meso- and metanotum with posterior meso- and metanotals; pronotum with a distinct median pair of spines: abdominal terga III-IV with a large spiniform posteromedian protrusion; Mindanao . . . . ***Armadolides* n. gen.**
— Posterior meso- and metanotals wanting; no median pair of spines on pronotum; abdominal terga unarmed . . . . ***Eubulides***

7. Shape slender, elongate and stick-like; body roughly uniform in diameter; mesothorax > 3x longer than prothorax; ovipositor short with subgenital plate multi-denticulated apically . . . . ***Stenobrimus***
— Stocky insects with body uneven in width; mesothorax widened posteriorly and < 2.5x longer than prothorax; ovipositor long with subgenital plate ± pointed apically **8**

8. Vertex rounded **9**
— Vertex distinctly inflated to conically raised **10**

9. Ovipositor slightly up-curved in lateral aspect; mesothorax gradually widening towards posterior and notably longer than wide with mesopleurae not deflexed; colouration brown and uneven; only Palawan . . . . ***Aretaon***
— Ovipositor straight in lateral aspect; mesothorax roundly rectangular in dorsal aspect with mesopleurae distinctly deflexed; colouration plain green dorsally; only Mindanao . . . . ***Mearnsiana***

10. Mesonotum strongly widening towards posterior and distinctly trapezoidal in dorsal aspect with widest part in posterior portion > 2.5x wider than anterior margin; metanotum with a pair of anterior mesal spines (may be indistinct) . . . . ***Trachyaretaon***
— Slenderer insects; mesonotum moderately gradually widening towards posterior with widest part in posterior portion no more than 2x width of anterior margin; metanotum lacking anterior mesal spines; only Luzon . . . . ***Sungaya***

Eggs

1. Opercular angle 90° or negative with operculum tilted towards ventral egg surface **2**
— Opercular angle ca. -40° with operculum tilted towards dorsal egg surface . . . . ***Stenobrimus***

2. Capsule mostly covered with setae or hairy appendages . . . . ***Tisamenus***
— Capsule surface at best with a few short setae anteriorly and on operculum **3**

3. Micropylar plate basically H-shaped with two anterior and two posterior lateral extensions . . . . ***Mearnsiana***
— Micropylar plate shaped like an inverted Y with only two posterior lateral extensions **4**

4. Capsule bulgy with polar area protruded and anterior portion distinctly constricted **5**
— Capsule ± bullet- or barrel-shaped with polar area rounded and anterior portion not constricted **6**

5. Polar area with an obtuse central protrusion; opercular angle indistinct . . . . ***Sungaya***
— Polar area indented and with an obtuse bulge dorsally and ventrally; operculum distinctly tilted towards ventral egg surface with opercular angle *ca.* -20° . . . . ***Obrimus***

6. Capsule elongate and > 2.3x longer than wide **7**
— Capsule shorter and < 2x longer than wide **9**

7. Micropylar plate very long and almost reaching to anterior margin of capsule **8**
— Microylar plate shorter and < ¾ the length of capsule and leaving a distinct gap to anterior margin . . . . ***Eubulides***

8. Anterior end of micropylar plate narrow and rounded; operculum distinctly oval and arched in lateralaspect . . . . ***Theramenes***
— Anterior end of micropylar plate broadened and ± angular; operculum almost circular and rather flat with a setose central protuberance . . . . ***Armadolides* n. gen.**

9. Microyplar plate with anterior end broad, angular and indented . . . . ***Aretaon***
— Anterior end of micropylar plate rounded **10**

10. Operculum inserted into capsule roughly at right angle; anterior portion of capsule with short setae; dorsal surface of capsule not notably bulgy . . . . ***Trachyaretaon***
— Operculum tilted towards ventral egg surface (opercular angle *ca.* -15°); capsule without setae anteriorly and dorsal surface notably more bulgy than ventral surface . . . . ***Brasidas***

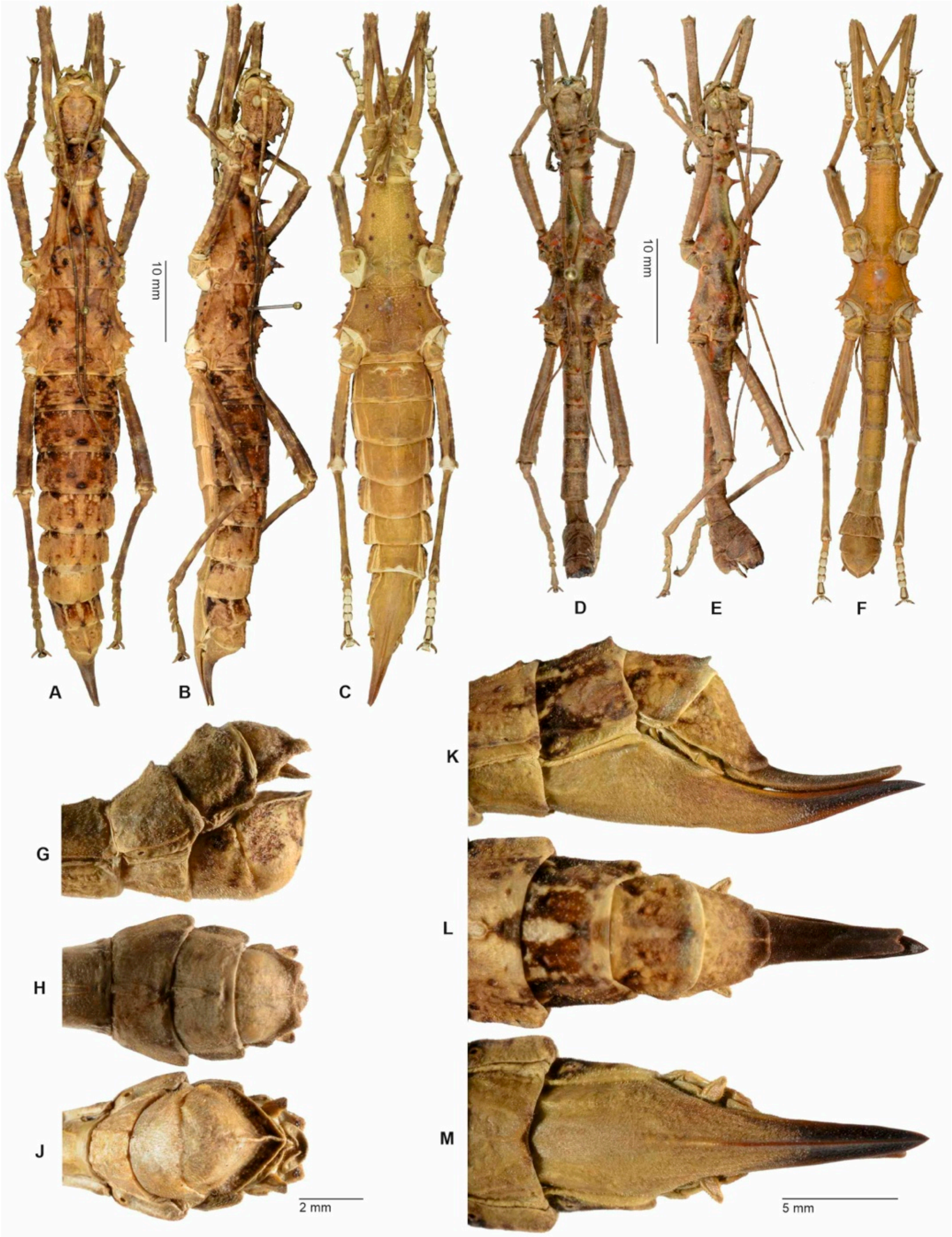

Fig. **2**. *Aretaon asperrimus* (Redtenbacher, 1906).

– **A**. ♀ dorsal view [FH 0118-62]. – **B**. ♀ dorsolateral view [FH 0118-62]. – **C**. ♀ ventral view [FH 0118-62]. – **D**. ♂ dorsal view [FH 0118-70]. – **E**. ♂ dorsolateral view [FH 0118-70]. – **F**. ♂ ventral view [FH 0118-74]. – **G**. Terminalia of ♂ in lateral view [FH 0118-74]. – **H**. Terminalia of ♂ in dorsal view [FH 0118-74]. – **J**. Terminalia of ♂ in ventral view [FH 0118-74]. – **K**. Terminalia of ♀ in lateral view [FH 0118-64]. – **L**. Terminalia of ♀ in dorsal view [FH 0118-64]. – **M**. Terminalia of ♀ in ventral view [FH 0118-64].

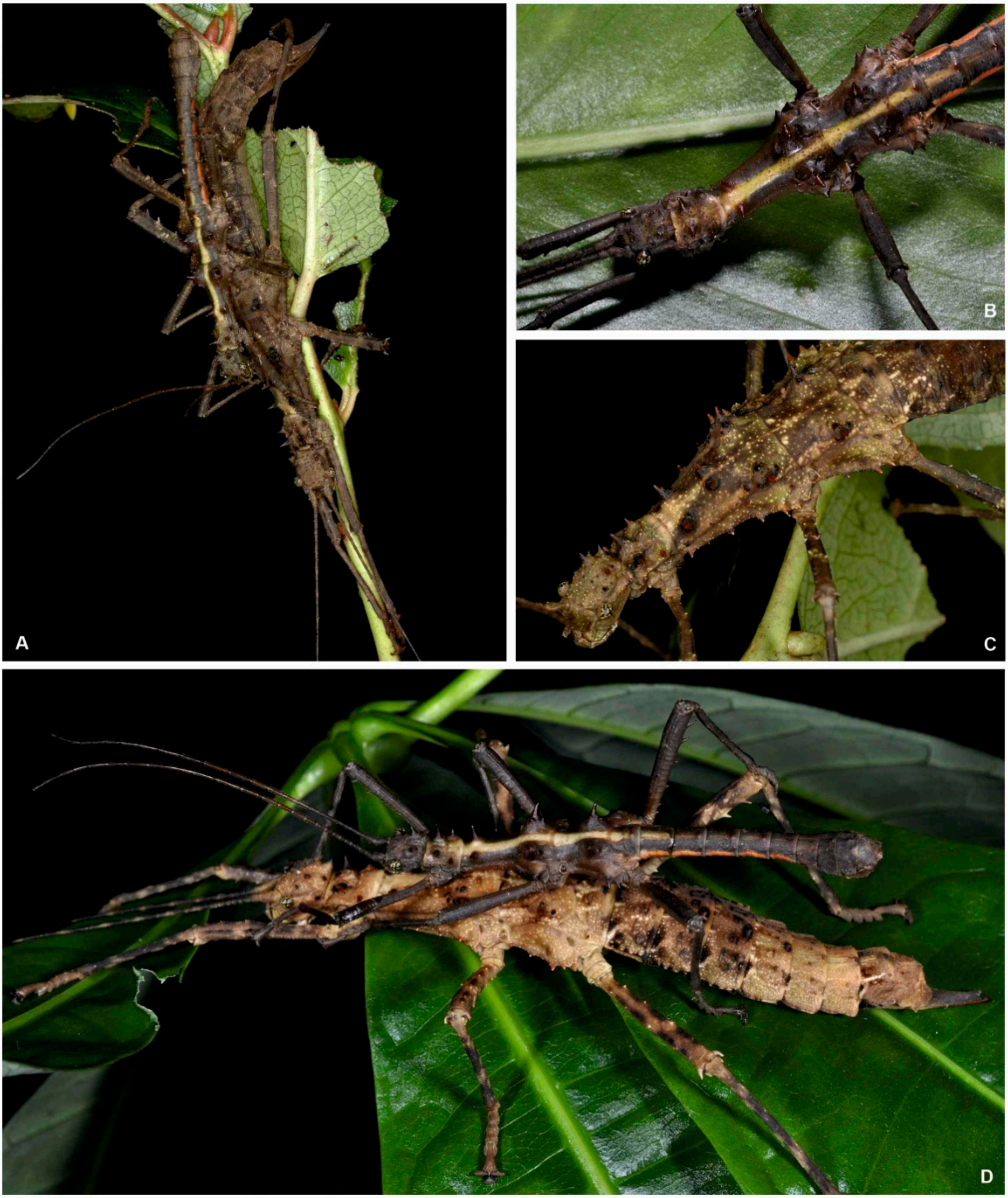

Fig. **3**. *Aretaon asperrimus* (Redtenbacher, 1906) live captive reared insects.
– **A**. Couple. – **B**. Closeup of head and thorax of ♂. – **C**. Closeup of head and thorax of ♀. – **D**. Couple.

comparison has not revealed any significant differences from Bornean populations nor did the eggs. This has questioned whether the Palawanese populations might be conspecific with typical *asperrimus* and only represent a local variety. This suspicion was supported by molecular data (Bank *et al.,* 2021), which clearly show that the populations in NE-Borneo and on Palawan represent the same species. The only slight morphological difference seen in the insects is the comparatively less developed body armature in the Palawanese population.

Detailed descriptions of the insects and eggs of Bornean specimens are available in a plethora of papers that either deal with the systematics, morphology, habits or captive breeding of *A. asperrimus*. Therefore, only illustrations of Palawanese specimens are here provided. A brief description was presented by Dräger (2014: 15), who also provided information on the culture history. The very numerous citations of this species may be referred to in the Phasmida Species File (http://Phasmida.SpeciesFile.org) and only the original type-specimens are listed above. Since still no lectotype has been designated for Redtenbacher's species, the ♀ that bears a red "Lectotypus" label in the collection of NHMW is here selected as the lectotype in order to provide stability of the taxon.

Body lengths of Palawanese specimens: ♀ 76.5-93.0 mm, ♂ 49.5-52.0 mm.

Distribution. – NE-Borneo, Sabah (Mount Kinabalu [NHMW; MNMS; ZMAS]; Mount Kinabalu, Poring Hot Springs 480 m [FH; OC]). Palawan (Mount Gantung [RBINS; FH]; Brook's Point [RBINS]; Tau't Batu Reserve, Singnapan Basin 200-300 m [RBINS]; Port Baton, Roxas 200-350 m [OZ]).

Genus *Armadolides* n. gen.

ZooBank: https://zoobank.org/D41A94DF-4B31-42E2-B78A-DFAFA3B60FAD

Description. – Small (body length < 50.0 mm) and moderately slender Obrimini with distinctive body armature, a prominent spiniform posteromedian protrusion on abdominal terga III-V and slender, distinctly spinose-dentate limbs. General body shape fairly elongate and almost uniform (♂, Fig. 5A-C) to sub-uniform (♀, Fig. 4A-C) in diameter. Body surface densely but unevenly granular to tubercular. Colour dark brown with elements of armature contrasting yellow to orange. Head notably longer than wide, sub-cylindrical with vertex flattened and just slightly raised at posterior margin; only the four coronals distinct. Antennae of moderate length and reaching to metanotum. Pronotum with a strong pair of pre-medial spines just in front of transverse median sulcus (Fig. 6A, D). Mesothorax almost parallel-sided and rectangular in outline and > 2.5x longer than prothorax. Posterior meso- and metanotals developed but small and obtusely spiniform (Fig. 6A-B, D-E). Meso- and metapleurae with obtuse tubercles; meso- and metapleural spine small and rather tubercular. Meso- and metasternum with distinct tubercles and very weakly bulgy medio-longitudinally. Abdominal segments transverse in ♀ and sub-quadrate in ♂; basal four segment somewhat inflated in ♀; II-II uniform in width in ♂. Terga III-V with a prominent, spiniform posteromedian protrusion (Fig. 4F), which is bi-fid in ♀; terga VIII and IX with an obtusely dentiform posteromedian swelling. Ovipositor weakly up-curved (Fig. 4J) with epiproct obtuse apically and subgenital plate acutely pointed and projecting beyond epiproct. Praeopercular organ on sternum VII a rounded median pit some distance in front of posterior margin (Fig. 4H). Poculum in ♂ bulgy, angular (Fig. 5H) and notched posteromedially (Fig. 5G). Vomer slender, basically triangular in shape with a long and gently curved terminal hook (Fig. 72G). Legs long, slender and will all carinae except for the ventral carinae of the smooth pro- and mesotibiae armed; dorsal carinae of femora dentate, ventral carinae rather spinose and dorsal carinae of tibiae very obtusely dentate to lobate. Flexure of profemora moderate. Medioventral carina of femora indistinct. Tarsi short and slightly less than half as long as corresponding tibiae.

Egg. – Of average size (length 5.2-5.5 mm), elongate, sub-circular in diameter and capsule about 2.3x longer than wide. Entire surface of capsule and micropylar plate densely pitted. Micropylar plate large and almost as long as capsule; anterior end broad and roundly angular, the two posterolateral extensions narrowed and reaching to polar end. Median line distinct and reaching to polar area. Operculum slightly elliptical, flattened and with an elliptic mount of setae in centre. Colour uniformly brownish dark grey.

Differentiation. – This remarkably and distinctive small new genus is closest to *Eubulides*, which it shares the flattened and sub-cylindrical head, which is just weakly raised at the posterior margin, anterior spines of the mesonotum and just slightly sub-parallel mesothorax of both sexes, as well as the characteristic praeopercular organ of ♀ that is formed by a rounded pit some distance in front of the posterior margin of abdominal sternum VII. *Armadolides* **n. gen.** however readily differs from *Eubulides* by the generally much more pronounced elements of the thoracic and abdominal armature, which includes a large pre-median pair of spines just in front of the transverse median sulcus of the pronotum (Fig. 6A, D), developed posterior meso- and metanotals (Fig. 6A-B, D-E), as well as a distinctive and large spiniform posteromedian protrusion on abdominal terga III-V (Fig. 4F). The latter character also separates this new genus from all other members of the whole of Obrimini. The eggs are very similar to those of *Eubulides* and merely differ by the relatively longer micropylar plate, which is almost as long as the capsule with the anterior end almost reaching to the anterior margin of the capsule.

Etymology. – The generic name is a combination of the Filipino "*armado*" (= armed, spiny) and the ending *-lides* of the closely related *Eubulides* Stål, 1875 to emphasize on the distinctive body armature and close relation to that genus. It is intended to mean "Spiny *Eubulides*". Neuter.

Remarks. – The eggs are not known.

Distribution. – Mindanao

Species included

1. ***Armadolides manobo*** (Acola, Naredo & Eusebio, 2002) **n. comb.**
Distribution: Mindano

Armadolides manobo (Acola, Naredo & Eusebio, 2002) n. comb.

(Fig. 3-6 & 72G)

ZooBank: https://zoobank.org/D41A94DF-4B31-42E2-B78A-DFAFA3B60FAD

Eubulides manobo Acola, Naredo & Eusebio, 2002: 7, fig. 3.

HT, ♀: Philippines : Mindanao Island, Mt. Mahuson, Apo Range, Sitio V, Brgy. Mahungkok, Magpet, North Cotabato [CMZ, No. 51000];

PT, 4 ♂: Philippines : Mindanao Island, Mt. Mahuson, Apo Range, Sitio V, Brgy. Mahungkok, Magpet, North Cotabato [CMZ, No's 51001 to 51004].

Material examined

5 ♀, **3** ♂, **1** ♀ (juvenile): Philippines, Mindanao, Bukidnon, Intavas IV. 2010, local collector [RBINS];

1 ♀: Philippines, Mindanao, Bukidnon, Mt. Kitanglad, II.2009, local collector, I. Lumawig [RBINS];

2 ♀: Philippines, Mindanao, Bukidnon, Intavas, V.2010, 8°16'N 124°59'E, leg I. Lumawig, gift from B. Kneubühler, I.G.32.613 [RBINS];

1 ♀: Philippines, Mindanao, Bukidnon, Valencia, leg I. Lumawig, gift from B. Kneubühler, I.G.32.613 [RBINS];

1 ♀: Philippinen, Mindanao Id., Bukidnon Prov., Municipality Sumilau, Intavas, local collector II.2010 [FH, No. 1350-1];

1 ♀, **1** ♂: Philippinen, Mindanao Id., Bukidnon Prov., Municipality Cabanglasan, local collector XII.2012 [FH, No. 1350-2 to 3].

Remarks. – It is noteworthy that the type specimens from Mount Mahuson, Apo Range are notably larger than the other examined specimens from throughout the Budidnon Province (Tab. 1). Moreover, the latter specimens appear somewhat slenderer in shape and have all elements of thoracic armature, but the posterior meso- and metanotals in particular, more pronounced and spinose. Acola *et al.* (2022: 11) stated the host plant at Mount Mahuson to be *Saurauia* sp. (Actinidiaceae).

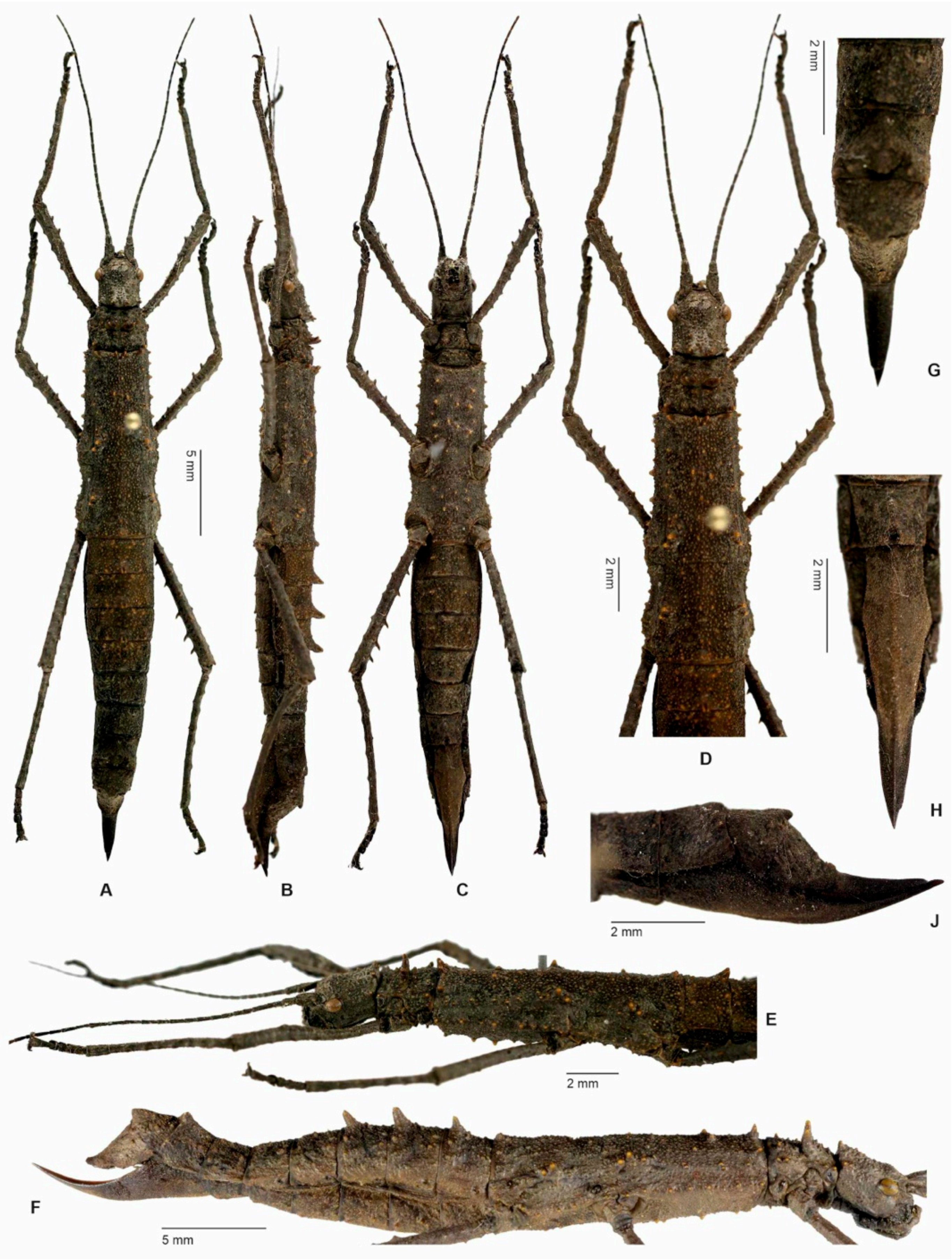

Fig. **4**. *Armadolides manobo* (Acola *et al*., 2022) **n**. **comb**. ♀ [all pictures of RBINS specimens © Jerome Constant].

– **A**. Habitus, dorsal view [RBINS]. – **B**. Habitus, lateral view [RBINS]. – **C**. Habitus, ventral view [RBINS]. – **D**. Head and thorax in dorsal view [RBINS]. – **E**. Head and thorax in lateral view [RBINS]. – **F**. Lateral view of body (epiproct detached) [FH 1350-1]. – **G**. Terminalia in dorsal view [RBINS]. – **H**. Terminalia in ventral view [RBINS]. – **J**. Terminalia in lateral view [RBINS].

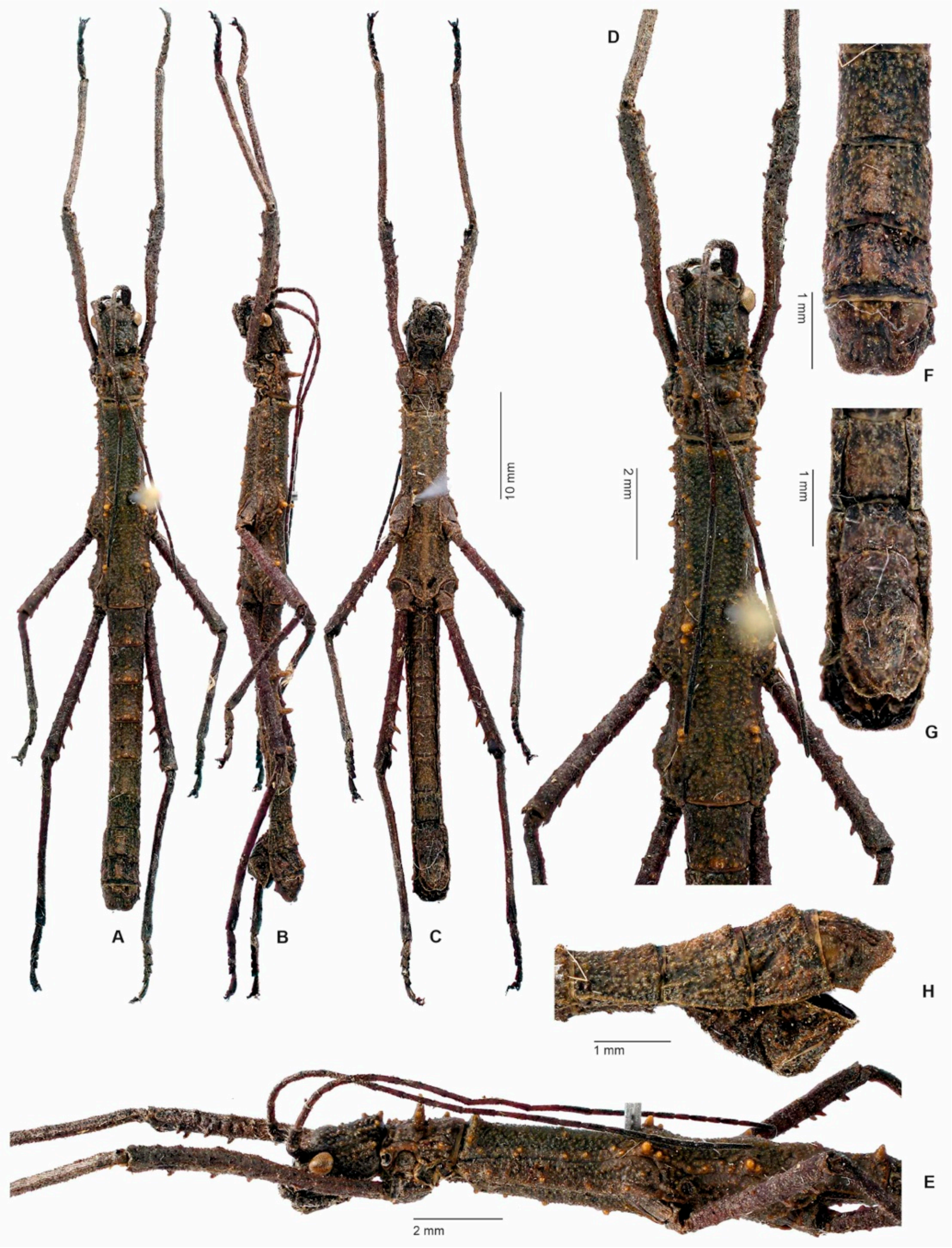

Fig. **5**. *Armadolides manobo* (Acola *et al.*, 2022) **n**. **comb**. ♂ [RBINS © Jerome Constant].

– **A**. Habitus dorsal view. – **B**. Habitus lateral view. – **C**. Habitus ventral view. – **D**. Head and thorax in dorsal view. – **E**. Head and thorax in lateral view. – **F**. Terminalia in dorsal view. – **G**. Terminalia in ventral view. – **H**. Terminalia in lateral view.

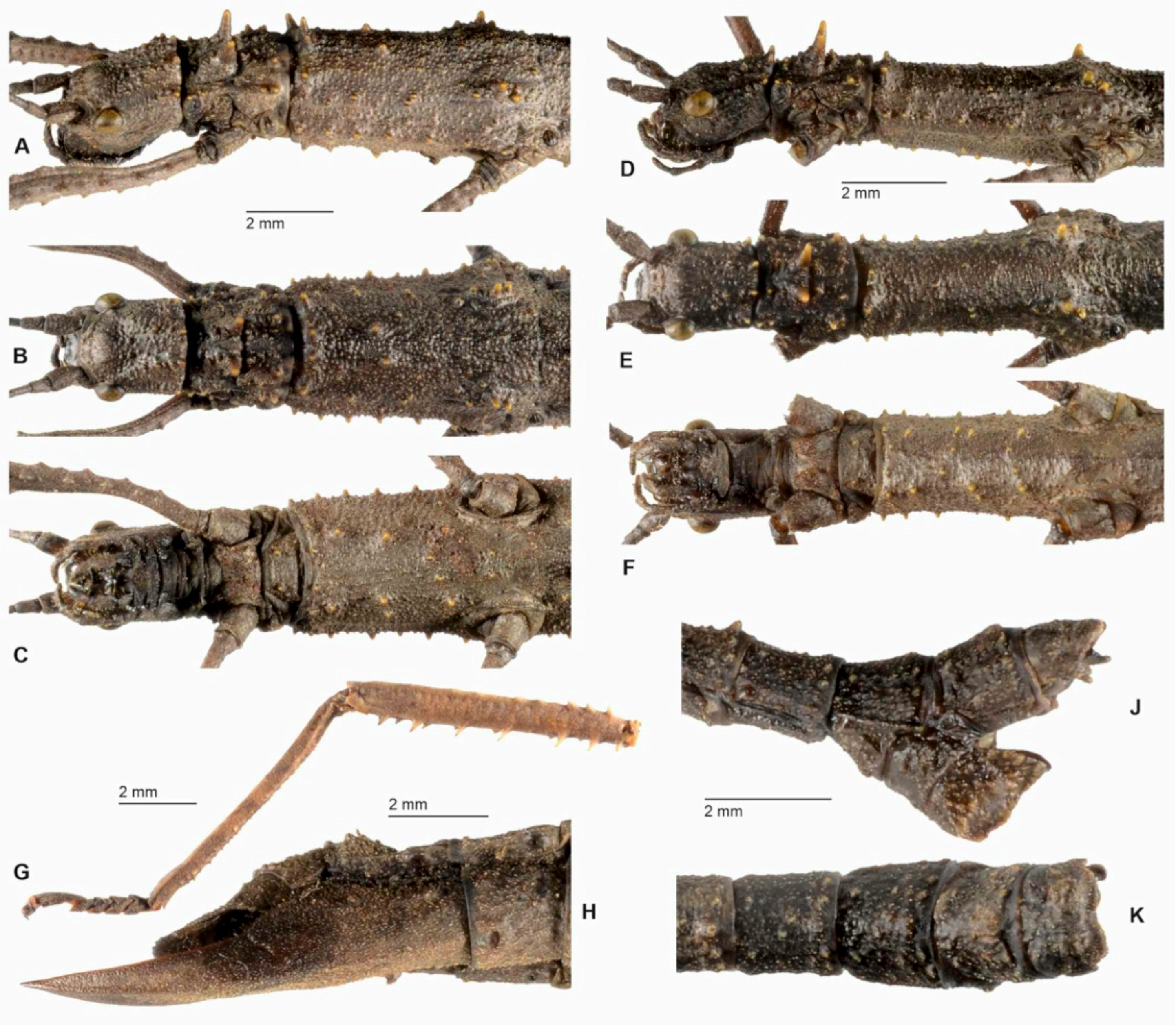

Fig. 6. *Armadolides manobo* (Acola *et al.*, 2022) **n. comb**.

– **A**. ♀ head, pro- and mesothorax lateral view [FH 1350-1]. – **B**. ♀ head, pro- and mesonotum dorsal view [FH 1350-1]. – **C**. ♀ head, pro- and mesosternum ventral view [FH 1350-1]. – **D**. ♂ head, pro- and mesothorax lateral view [FH 1350-2]. – **E**. ♂ head, pro- and mesonotum dorsal view [FH 1350-2]. – **F**. ♂ head, pro- and mesosternum ventral view [FH 1350-2]. – **G**. ♀ left hind leg in intero-lateral view [FH 1350-1]. – **H**. ♀ terminalia in ventral view (epiproct detached) [FH 1350-1]. – **J**. Terminalia of ♂ in lateral view [FH 1350-2]. – **K**. Terminalia of ♂ in dorsal view [FH 1350-2].

Distribution. – Mindanao, endemic. Province North Cotabato (Mt. Apo Range, Mount Mahuson Magpet [CMZ] – type locality); Province Bukidnon (Sumilao, Intavas [FH, RBINS]; Cabanglasan [FH]; Mount Kitanglad [RBINS]; Valencia [RBINS]).

Genus ***Brasidas*** Rehn & Rehn, 1939

= *Euobrimus* Rehn & Rehn, 1939: 445. **n**. **syn**.

Differentiation. – This genus is well characterised and differentiated from all others within Obriminae by the prominent metasternal pseudo-foramina, which are seen to be deep, open pits or holes that are semi-cingulate to cingulate in shape. Similar foramina are besides only found in the closely related *Obrimus*, in which however these are only represented by slit-like invaginations along the lateral margins of the metasternum. While the insects agree in almost all other morphological aspects, the eggs of *Brasidas* differ from those of *Obrimus* by their simple shape elongate and basically barrel-like shape with a rounded polar area.

Remarks. – Rehn & Rehn (1939) distinguished between *Brasidas* and *Euobrimus* on the basis that the metasternal pseudo-foramina are either semi-cingulate (*Brasidas*) or completely cingulate in (*Euobrimus*). This distinction, however, was already doubted by Hennemann *et al.* (2016: 17) and Bank *et al.* (2021) who stated that further investigation was needed to evaluate the taxonomic boundaries between these two taxa. Examination of as many examples as possible of all known species of both genera has now show there to be a fairly smooth transition from semi-cingulate towards fully cingulate metasternal pits and even revealed slight variability within individual species. Thus, *Euobrimus* is here synonymised with *Brasidas* (**n**. **syn**.). Moreover, series of some

	♀, **HT** [CMZ]*	♂, **PT** [CMZ]*	♀ [RBINS, FH]	♂ [FH]
Body	60.00	41.15	43.5-46.7	32.6
Pronotum	4.20	2.30	2.9-3.0	2.4
Mesonotum	9.80	7.56	7.6-8.0	6.5
Metanotum	4.80	3.43	2.8-3.1	2.4
Median segment	2.70	1.60	1.8-1.9	1.6
Profemora	10.10	8.85	8.3-8.8	8.1
Mesofemora	10.00	9.05	7.0-7.3	6.2
Metafemora	13.50	7.95	9.2-9.4	8.3
Protibiae	10.85	6.65	7.5-8.1	7.8
Mesotibiae	9.55	10.05	7.1-7.3	6.6
Metatibia	14.00	10.01	9-7-9.8	9.0
Antennae	-	-	*ca.* 18.0	*ca.* 16.0

Table 1. Measurements of *Amardolides manobo* Acola, Naredo & Eusebio (2022) **n. comb**. * According to Acola *et al.* (2022: 8, 10)

species, but *Brasidas lacerta* (Redtenbacher, 1906) **n**. **comb**. from Mindanao in particular, have revealed remarkable intraspecific variability, which results in an array of new synonyms. As a result, the previously recognised six species in *Brasidas* and eight species in *Euobrimus* are here reduced from 14 to only seven valid and morphologically well recognised species, one of which is described as new. One species previously attributed to *Brasidas*, i. e. *quadratipes* Bolivar, 1890, is here transferred back to its original genus *Obrimus* because it lacks the characteristic pit-like metasternal pseudo-foramina. Molecular studies have revealed *Brasidas* as the sister-taxon of *Obrimus* (Brank *et al.*, 2021). A key is provided below to distinguish between the known species of *Brasidas*. The numerous citations of *Brasidas* and *Euobrimus* are available in the Phasmida Species File (http://Phasmida.SpeciesFile.org).

The keys to the species of *Brasidas* and *Euobrimus* provided by Rehn & Rehn (1939) have proven to be of little use for a steady distinction of species, mainly for two reasons. The keys are predominantly based on the head and body spination of the insects, which however often underlies considerable intraspecific variability Thus, key features used by Rehn & Rehn (1939) like "basal abdominal terga unarmed vs. armed with paired spines" are unreliable, since e. g. *Brasidas viscayanus* obviously shows that this can be variable within individual species. A considerable number of species were described from immature specimens, but large series of various species and captive breeding clearly prove that the spination quite frequently shows significant differences between adults and nymphs of individual species. Consequently, the head and body armature alone cannot serve for a sufficient and reliable distinction between species within *Brasidas*, why the new keys presented below target on using other or at least additional morphological and also chromatic characters with the spination only used where appropriate and evaluated as being constant within individual species.

Apparently, the diversity of the genus is not yet fully known and there seem to be further as yet unnamed species. A presumably new species from the island of Camiguin was reported by Bank *et al.* (2021) but specimens have not been examined.

Distribution. – Philippines, endemic. So far recorded from the islands of Luzon, Leyte, Rapu Rapu, Samar, Siargao, Camiguin and Mindanao.

Species included

1. ***Brasidas bakeri*** (Rehn & Rehn, 1939: 452, pl. 35: 32, 37: 39) [*Euobrimus*]. **n**. **comb**.
= *Euobrimus hoplites* Rehn & Rehn, 1939: 450, fig. 6. **n**. **syn**.
Distribution. – Samar, Leyte & Luzon.

2. ***Brasidas cavernosus*** (Stål, 1877: 68) [*Obrimus*]. **n**. **comb**.
Distribution. – Luzon, Rapu Rapu & Leyte.

3. ***Brasidas foveolatus*** (Redtenbacher, 1906: 40) [*Obrimus*]. **n**. **comb**.
Comments. – Unfortunately, the unique holotype ♂ is not traced in the collection of MNHN and must be presumed lost and the original description is very incomplete. The fairly large size (body length 63.5 mm according to Redtenbacher), slender form and bi-spinose abdominal terga II-IV suggest close resemblance to B. *viscayanus* Rehn & Rehn, 1939. However, the description of the metasternum "on each side only with a shallow pit that is exteriorly merely restricted by a fold and some granules" does not fit *viscayanus* or the other highly polymorphic Mindanaoan species *B. lacerta* (Redtenbacher, 1908), which both have a pair of deep, cingulate foramina. Actually, this description of the metasternum rather resembles *B. cavernosus* (Stål, 1877) and *B. samarensis* Rehn & Rehn, 1939, both of which however don't occur on Mindanao. Thus, without seeing the type specimen and Mindanaoan material that fully matches the mentioned characters, the identity of Redtenbacher's species must remain unclarified. The specimens assigned to *foveolatus* by Rehn & Rehn (1939: 435, pl. 34: 25) deserve evaluation.
Distribution. – Mindanao.

4. ***Brasidas lacerta*** (Redtenbacher, 1906: 39) [*Obrimus*]. **n. comb.**
= *Brasidas acanthoderus* Rehn & Rehn, 1939: 443, pl. 33: 24. **n**. **syn**.
= *Euobrimus atherura* Rehn & Rehn, 1939: 446, pl. 33: 22, 35: 31. **n**. **syn**.
= *Euobrimus cleggi* Rehn & Rehn, 1939: 455, pl 33: 21, 37: 40. **n**. **syn**.
= *Euobrimus dohrni* Rehn & Rehn, 1939: 450. **n**. **syn**.
= *Brasidas foveolatus asper* Rehn & Rehn, 1939: 437, pl. 34: 26. **n**. **syn**.
= *Brasidas montivagus* Rehn & Rehn, 1939: 440, pl. 33: 19-24. **n**. **syn**.
= *Euobrimus stephenreyesi* Lit & Eusebio, 2006: 101, figs. 1a-b. **n**. **syn**.
Distribution. – Mindanao.

5. ***Brasidas malaki*** **n**. **sp**.
Distribution. – Leyte.

6. ***Brasidas manobo*** **n**. **sp**.
Distribution. – Mindanao.

7. ***Brasidas rehni*** **n**. **sp**.
Distribution. – Siargao.

8. ***Brasidas samarensis*** Rehn & Rehn, 1939: 432, pl. 35: 33, 36: 37.
Distribution. – Samar.

9. ***Brasidas viscayanus*** Rehn & Rehn, 1939: 438, pl. 31: 12, 34: 27, 38: 45.
Distribution. – Mindanao.

10. ***Brasidas waray*** **n**. **sp**.
Distribution. – Leyte.

Keys to the species of *Brasidas*

♂ *

1. Metasternal pseudo-foramina semi-cingulate pits that are open interiorly 2

— Metasternal pseudo-foramina deep cingulate holes 5

2. Abdominal terga II-IV unarmed 3

— Abdominal terga II-IV with a pair of spines; Mindanao . . . . ***foveolatus***

3. Head and thorax basically brown; posterior meso- and metanotals spinose and compound 4

— Head and thorax green; posterior meso- and metanotals represented by very large and strong conical Swellings (Fig. 15H); Leyte . . . . ***malaki* n. sp.**

4. Mesothorax brown or green (mostly with a green medio-longitudinal streak); femora monochromatic; Samar . . . . ***samarensis***

— Mesothorax reddish to rusty brown laterally (Fig. 10D); femora dark purple ventrally (Fig. 9E); Luzon, Rapu Rapu & Leyte . . . . ***cavernosus***

5. Thoracic terga unicoloured; abdominal terga II-III with a pair of spines; anterior mesonotals distinct, spinose 7

— Dorsal surface of thorax with a green medio-longitudinal streak; abdominal terga II-III unarmed; anterior mesonotals reduced or absent . . . 6

6. Vertex spinose; anterior mesonotals tuberculate (Fig. 17G); metasternal pseudo-foramina large and oval (Fig. 70M); Mindanao . . . . ***manobo* n. sp.**

— Vertex tubercular; anterior mesonotals absent (Fig. 18E); metasternal pseudo-foramina elliptical (Fig. 70P); Surigao . . . . ***rehni* n. sp.**

7. Shape moderately stocky with mesothorax < 3x longer than prothorax; metasternal foramina large and ± round in outline; Mindanao 8

— Slender with mesothorax > 3.6x longer than prothorax; metasternal foramina small, narrow and elliptical in shape (Fig. 70B); Samar, Leyte & Luzon . . . . ***bakeri***

8. Large (body length > 70.0 mm) and slender with abdominal tergum IV 1.75x longer than wide; meso- and metasternum obtusely keeled medio-longitudinally (Fig. 70K) . . . . ***viscayanus***

— Smaller (body length < 60.0 mm) and stockier with abdominal tergum IV ≤ 1.65x longer than wide; no distinct medio-longitudinal keel on meso- and metasternum (Fig. 70F) . . . . ***lacerta***

* The ♂ of *B. waray* **n. sp.** is not known.

♀

1. Metasternal pseudo-foramina semi-cingulate pits that are open interiorly 2

— Metasternal pseudo-foramina deep cingulate holes 4

2. Habitus stocky, abdominal segment IV > 1.8x wider than long; mesonotum narrowed anterior and meso-thorax distinctly trapezoidal in dorsal aspect; mesonotum < 2x longer than width of posterior margin; abdominal terga multi-spinose 3

— Slenderer in shape, abdominal segment IV only 1.65x wider than long (Fig. 22A); mesonotum parallel-sided and roughly rectangular in shape, mesothorax just weakly trapezoidal in dorsal aspect; abdominal terga II-V merely with a small pair of antero-lateral spines; Leyte . . . . ***waray* n. sp.**

3. Habitus rather slender, abdominal segment IV 1.8x wider than long and metathorax 2.2x wider than prothorax (Fig. 9A); posterior margin of abdominal sternum VII deeply notched medially and obtusely bi-lobate (Fig. 9J); Luzon, Rapu & Leyte . . . . . . ***cavernosus***

— Stockier in shape, abdominal segment IV 2.3x wider than long, metathorax more strongly widened and 2.6x wider than prothorax (Fig. 19A); posterior margin of abdominal sternum VII only with a rather shallow median notch and not distinctly bi-lobate (Fig. 19J); Samar . . . . ***samarensis***

4. Mesothorax distinctly widening towards posterior and metathorax notably broadest portion of body; head with vertex convex and with a distinct pair of occipital medial spines; Mindanao 5

— Slender with body sub-uniform in diameter; vertex flattened, occipital medials reduced and much smaller than coronals (Fig. 7G, 8H); Samar, Leyte & Luzon . . . . ***bakeri***

5. All elements of head and body armature distinct; anterior mesonotals distinct; metasternal pseudo-foramina large and oval to sub-circular in shape; Mindanao **6**

— Head and body armature weakly developed; anterior mesonotals absent (Fig. 18A-B); metasternal pseudo- Foramina small and triangular (Fig. 70O); Surigao .... ***rehni*** **n. sp.**

6. Body length > 105.0 mm; post-medial mesonotals small or absent; abdominal tergum VII unarmed **7**

— Large, body length > 115.0 mm; mesonotum with a strong pair of post-medial spines (Fig. 16G); abdominal tergum VII spinose (Fig. 16D) .... ***manobo*** **n. sp.**

7. Body length usually > 90.0 mm; mesonotum almost parallel-sided and rectangular; 2.25x longer than width at posterior margin; posterior meso- and metanotals a single long spine with merely a few minute tubercles around the base; angle of triangular posteromedian indention of anal segment roughly 90° (Fig. 20C) .... ***viscayanus***

— Smaller on average (body length rarely exceeding 90.0 mm); mesonotum narrowing anteriorly and 2x longer than width at posterior margin; posterior meso- and metanotals compound and multi-spinose; angle of triangular posteromedian indention of anal segment ± 110° (Fig. 12B) .... ***lacerta***

* The ♀ of *B. foveolatus* (Redtenbacher, 1906) is not known.

Brasidas bakeri Rehn & Rehn, 1939

(Fig. 7-8, 70A-B & 73C-D)

Euobrimus bakeri Rehn & Rehn, 1939: 452, pl. 35: 32, 37: 39.

HT, ♂: Island, Samar, Baker; USNM; *Euobrimus bakeri* Rehn + Rehn, Type; Type No. 53317, U.S.N.M [USNM];

PT, ♀: Island, Samar, Baker; USNM; *Euobrimus bakeri* Rehn + Rehn, Paratype; Type No. 53317, U.S.N.M [USNM];

PT, ♀: Island, Samar, Baker; *Euobrimus bakeri* Rehn + Rehn, Paratype [ANSP].

- Zompro, 2004: 216.
- Otte & Brock, 2005: 137.
- Brock & Büscher, 2022: 521.

= *Euobrimus hoplites* Rehn & Rehn, 1939: 450, fig. 6.

HT, ♂ (juvenile): Island Samar, Baker; *Euobrimus hoplites* Rehn + Rehn, Type, 1342, Hebard Cln.; Data Base Serial No. assigned as Type No. September 2008, Type# 9122[ANSP]. **n. syn**.

- Otte, 1978: 79. (Type data)
- Zompro, 2004: 216.
- Otte & Brock, 2005: 137.
- Brock & Büscher, 2022: 521.

Obrimus lacerta Redtenbacher, 1906: 39 (in part – only **PLT**, ♂: Type; Luzon, Jagor; *Obrimus perforatus* Redt. n. sp.; 3220, Zool. Mus. Berlin [MNHU]).

Material examined

1 ♂: Philippinen, Eastern Visayas, Provinz Northern Samar, Samar Island, Lope de Vega, local collector II.2009 [FH, No. 1128-1];

1 ♀, **2** ♂: Philippinen, O-Luzon Id., Provinz Aurora, Dingalan, local collector X.2012 [FH No's 1128-2 to 4];

1 ♂: Philippinen, Prov. Leyte, S-Leyte Island, Mahaplag, lowland, local collector VI.2012 [FH, No. 1128-5];

1 ♀, **1** ♂, **1** egg: Philippines, Leyte Island, Mt. Balocaue, 19-29IX. 2005, leg. R. Cabale [RBINS];

4 ♀, **1** ♂, **1** egg: Philippines, Samar Isl., Mount Capoto 2010, 12°13'12"N 125°08'22"E, I.G. 32,386 Gift J. Bresseel, Leg. R. Cabale [RBINS].

Differentiation. – Close to *B. viscayanus* from the island of Mindanao but both sexes much slenderer and the vertex flattened and lacking distinct occipital medials (Fig. 7G-H, 8H), whereas the head is rather globose with the vertex roundly convex and a distinct pair of occipitals medial spines in *viscayanus*. Females may also be separated from those of *viscayanus* by the distinct medio-longitudinal bulge of the meso- and metanotum and three dorsal abdominal terga, almost parallel-sided mesonotum (notably widening towards the posterior in *viscayanus*), much smaller mesosternals, noticeably larger and rather oval metasternal pseudo-foramina, that cover about two-thirds of the lateral portion of the metasternum in front of the metacoxal (Fig. 70A), and shorter ovipositor, in which the visible part of the epiproct is scarcely longer than the anal segment. Males may additionally be distinguished from *viscayanus* by the much longer mesothorax (3.6x vs. 3.2x longer than pronotum in *viscayanus*), narrower and slit-shaped metasternal pseudo-foramina (Fig. 70B, rather oval in *viscayanus*), more distinct anterior pair of spines on abdominal terga II-III and almost straight and entire posterior margin of the anal segment (Fig. 7M, distinctly bilobed in *viscayanus*).

Variability. – The specimens available show some variability in the spination of the thorax and three basal abdominal terga. The ♀ from Dingalan, Luzon matches well with the type-specimens but has the meso- and metathoracic spines notably longer with the medio-lateral mesonotal particularly strong. In ♂ the spines of the mesonotum in particular show variability in the five examples available, with these being remarkably strong in the specimens from Mount Balocaue, Leyte in the collection of RBINS (Fig. 8J). The ♂ from Lope de Vega, Samar (Fig. 7A-B) is lighter in colour than the four other examples from Luzon, Leyte and Samar and bears a moderately distinct pair of median mesonotals. This pair of spines is similarly large in the specimen from Mount Mahaplag, Leyte, whereas the ♂ from Mount Balocaue, Leyte is remarkable for having all elements of the head and body armature notably more developed than any of the other examined specimens with the posterior meso- and metanotals particularly prominent and bi-fid. Therefore, the pair from Mount Balocaue is here illustrated on a separate plate (Fig. 8). The two examples from Luzon differ considerably from each other in aspect of the mesonotal armature, one having the median mesonotals only represented by a pair of small tubercles like in the holotype, the other having these spines moderately developed and even bearing a pair of similarly sized pre-median mesonotals. The occipitals also show noteworthy variability in size among these four specimens. Body lengths: ♀ 89.5-90.5 mm, ♂ 56.0-60.5 mm.

Description of egg (Fig. 73C-D). – Moderately sized for the genus; slightly oval in cross-section; about 1.8x longer than wide. Capsule curved in lateral aspect with ventral surface almost plain and dorsal surface strongly convex. Surface sparsely and unevenly pitted; surface otherwise smooth except for the anterior one-fifth and operculum, which are minutely rugulose. Micropylar plate large and

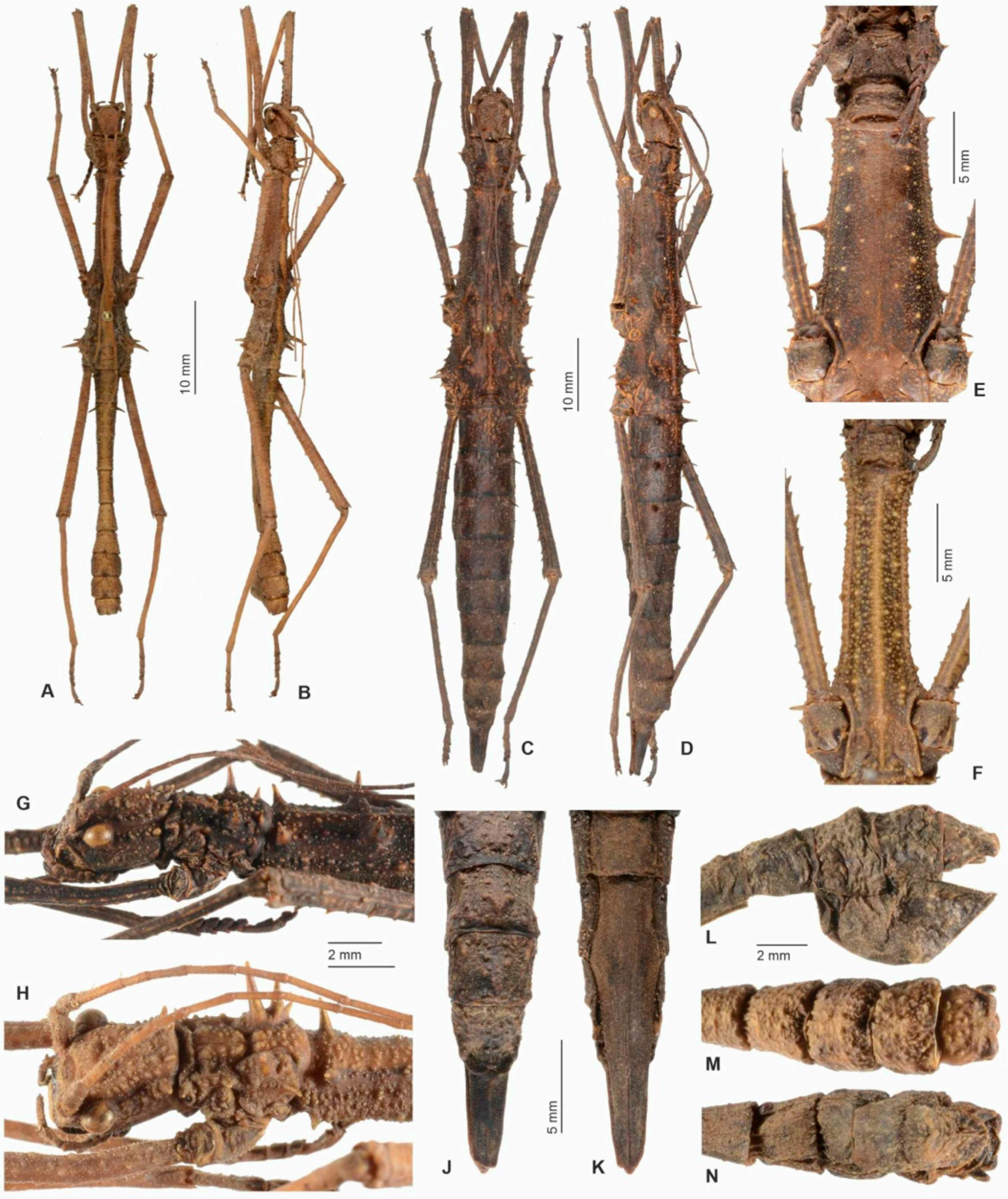

Fig. **7**. *Brasidas bakeri* (Rehn & Rehn, 1939) **n**. **comb**.

– **A**. ♂ dorsal view (N-Samar, Lope de Vega) [FH 1128-1]. – **B**. ♂ dorsolateral view (N-Samar, Lope de Vega) [FH 1128-1]. – **C**. ♀ dorsal view (N-Luzon, Aurora, Dingalan) [FH 1128-1]. – **D**. ♀ dorsal view (N-Luzon, Aurora, Dingalan) [FH 1128-2]. – **E**. Mesosternum of ♀ (N-Luzon, Aurora, Duingalan) [FH 1128-2]. – **F**. Mesosternum of ♂ (S-Leyte, Mahaplag) [FH 1128-5]. – **G**. Head, prothorax and anterior of mesonotum of ♀ in lateral view (N-Luzon, Aurora, Dingalan) [FH 1128-2]. – **H**. Head, prothorax and anterior of mesonotum of ♂ in lateral view (N-Samar, Lope de Vega) [FH 1128-1]. – **J**. Terminalia of ♀ in dorsal view (N-Luzon, Aurora, Dingalan) [FH 1128-2]. – **K**. Terminalia of ♀ in ventral view (N-Luzon, Aurora, Dingalan) [FH 1128-2]. – **L**. Terminalia of ♂ in lateral view (N-Luzon, Aurora, Dingalan) [FH 1128-4]. – **M**. Terminalia of ♂ in dorsal view (N-Luzon, Aurora, Dingalan) [FH 1128-1]. – **N**. Terminalia of ♂ in ventral view (N-Luzon, Aurora, Dingalan) [FH 1128-1].

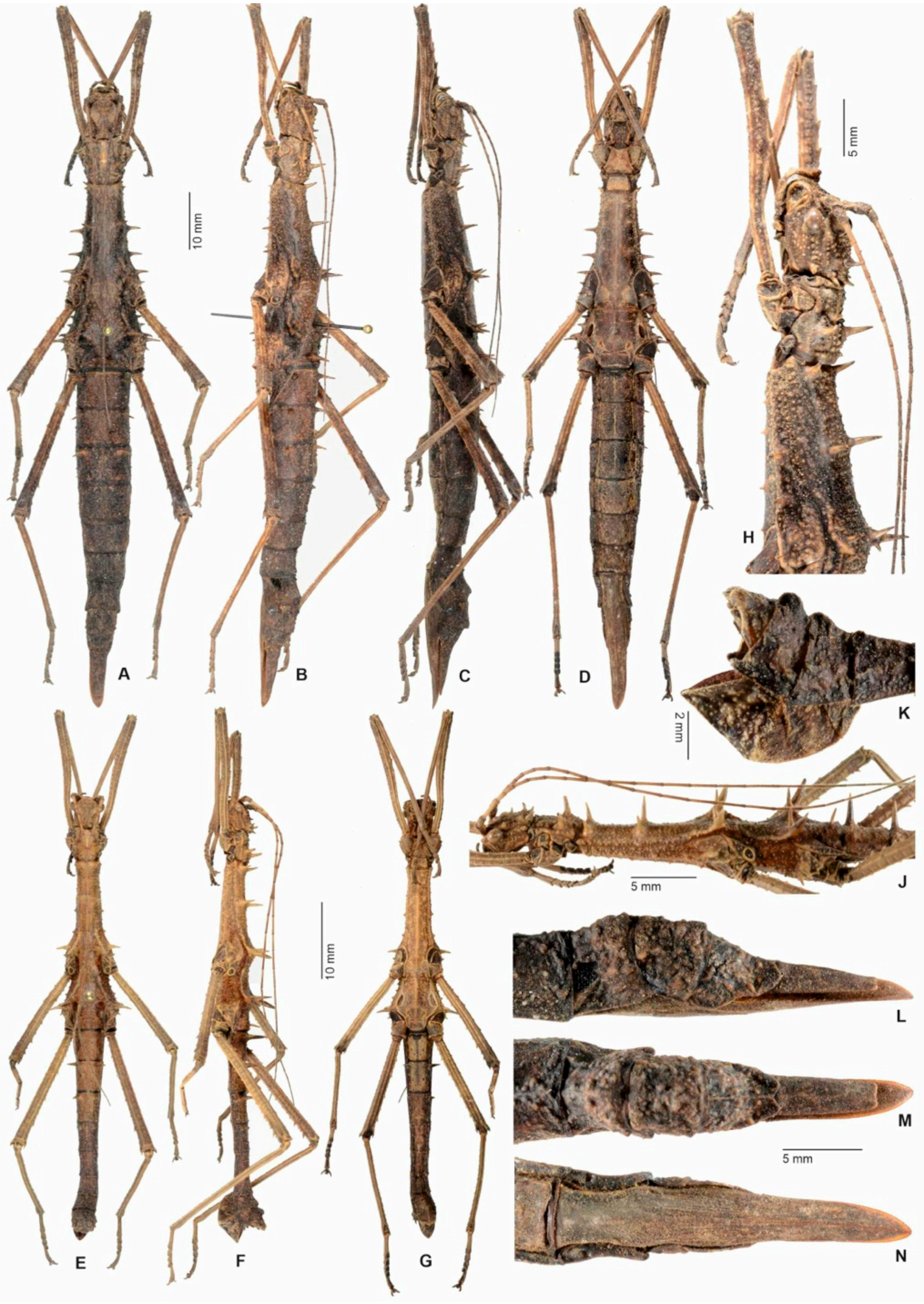

Fig. **8**. *Brasidas bakeri* (Rehn & Rehn, 1939) **n**. **comb**. from Leyte, Mount Balocaue [RBINS].

– **A**. ♀ dorsal view. – **B**. ♀ dorsolateral view. – **C**. ♀ lateral view. – **D**. ♀ ventral view. – **E**. ♂ dorsal view. – **F**. ♂ lateral view. – **G**. ♂ ventral view. – **H**. Head, pro- and anterior of mesothorax of ♀ in dorsolateral view. – **J**. Head and thorax of ♂ in lateral view. – **K**. Terminalia of ♂ in lateral view. – **L**. Terminalia of ♀ in dorsolateral view. – **M**. Terminalia of ♀ in dorsal view. – **N**. Terminalia of ♂ in ventral view.

0.8x the length capsule; broadly Y-shaped with the median portion parallel-sided and obtusely rounded anteriorly and the two posterolateral extensions rather short, oval and extending on lateral surfaces of capsule at an angle of about 80°; surface of plate pitted like capsule and the outer margin weakly inflated and unevenly rugulose. Posterior portion of plate widely V-shaped with a minute knob-shaped micropylar cup in centre. Median line distinct and formed by a narrow bulge that almost extends to polar area. Operculum almost round with the outer margin flat and the centre weakly swollen; surface rugulose with irregular radially directed furrows; inserted into capsule at an angle of about 20°. General colour plain greyish with the anterior portion of capsule brownish; outer margin of micropylar plate slightly darker grey than capsule. Measurements [mm]: Length 5.3, width 2.7, height 3.0, length of micropylar plate 4.0.

Remarks. – *Euobrimus hoplites* Rehn & Rehn, 1939 is a juvenile ♂ and hence here synonymised with *B. bakeri* (**n. syn.**). This nymph agrees in the mesonotal spination with a specimen from East Luzon in the authors collection (FH 1128-4) and merely has the three mesopleural spines more developed than adult specimens, which is not unusual within Obriminae. The other differences mentioned by Rehn & Rehn (1939: 451) also fall within the intraspecific variability of *bakeri*, which the specimens now at hand shown to be fairly remarkably. Although *hoplites* would have page priority over *bakeri* (page 450 vs. 452), *bakeri* is here chosen as the valid name because this taxon is based on three adult specimens and thus provides more sufficient stability of this species. The new material now at hand from the authors collection represent three new records of this rather distinctive species, which extend the range to the islands of Luzon and Leyte.

Distribution. – Samar, Luzon and Leyte. "Samar" [USNM, ANSP]; Province Northern Samar, Lope de Vega [FH]; Province Samar, Mount Capoto-on [RBINS]. "Luzon" [MNHU]. East Luzon, Province Aurora (Dingalan [FH]). Province Leyte, South Leyte (Mahaplag [FH], Mount Balocaue [RBINS]).

Brasidas cavernosus (Stål, 1877) **n. comb.**

(Fig. 9-10, 70C-D, 72A & 73E-F)

Obrimus cavernosus Stål, 1877: 68.

HT, ♀: Ins. Philip.; Typus; *cavernosus* [NHRS].

- Elera, 1895: 200.
- Kirby, 1904: 398.
- Redtenbacher, 1906: 39, pl. 1: 6. (in part - only ♀ from Luzon; ♂ from Mindanao is a distinct species)
- Bruner, 1915: 35.
- Sjöstedt, 1933: 2. (Type data)
- Günther, 1935: 124.

Euobrimus cavernosus, Zompro, 2004: 216.

- Otte & Brock, 2005: 137.
- Brock & Büscher, 2022: 521.

Obrimus lacerta Redtenbacher, 1906: 39 (in part – only **PLT**, ♂ (penultimate instar): Coll. Br.v.W., Philippinen, Schneider; det. Redtenb. *Obrimus lacerta*; 14.470 [NHMW]).

Euobrimus lacerta, Krijns, 2012: 14, figs. (Rearing notes, description of egg)

- Harman, 2014: 20. (Culture stock origin)
- Harman, 2022: 22. (Culture stock origin)

[**Not**: *Euobrimus cavernosus*, Rehn & Rehn, 1939: 449, pl. 31: 8 (♂), 36: 38 (♀), 38: 44 (♀ metasternum). Misidentification *Brasidas rehni* **n. sp**.]

Material examined

12 ♀, **9** ♂, **1** ♀ (penultimate instar), eggs: ex Zucht F. Hennemann 2011-2014, Philippinen, SO-Luzon, Prov. Bicol, Sorsogon, Pocdol Mts., Mt. Pulog NP, Mt. Pulog, X.2010 [FH, No's 0768-1 to 22 & E1];

6 ♀, **9** ♂, eggs: ex Zucht F. Hennemann 2012-2014, Philippinen, Prov. Albay, Rapu-Rapu Id., leg. T. Heitzmann 2011 X.2010 [FH, No's 0768-23 to 37 & E2];

2 ♀, **1** ♂: Philippinen, S Luzon Id., Bicol Region, Provinz Sorsogon, Pocdol Mountains, local collector, IX.2010 [FH, No`s 0768-38-40];

1 ♀: Philippinen, S Luzon Id., Bicol Region, Provinz Sorsogon, Mount Bulusan, local collector, II.2003 [FH, No. 0768-41];

1 ♂: Philippinen, S Luzon Id., Bicol Region, Provinz Sorsogon, Mount Bulusan, local collector, IX.2012 [FH, No. 0768-42];

1 ♀ (n5): Philippinen, Ost Luzon Island, Provinz Aurora, Sierra Madre, Dingalan, 230 m, local collector, X.2010 [FH, No. 0768-43];

1 ♀: Philippinen, Eastern Visayas, Prov. Leyte, Leyte Island, Mahaplag Munip., local collector, II.2012 [FH, No. 0768-44];

1 ♀, **1** ♂: Philippines, Luzon, Bicol, Sorosogon, Oct. 2010, Leg Heitzmann [RBINS];

1 ♂: Philippines, Luzon, Bicol, Mt. Osiao, Leg T. Heitzmann & A. Kang, X.2009 [RBINS];

3 ♀, **2** ♂: Ex Breeding Illy Klimmert 2013; Origin: Philippines, S Luzon, Mt. Pulog, Sorsogon [RBINS];

5 ♀, **5** ♂: Ex Culture Bresseel 2013; Philippines, Luzon, Bicol peninsula, Albay Province, Rapu Rapu Island, Leg Heitzmann 2011 [RBINS].

Differentiation. – This large representative of the genus comes morphologically very close to *B. samarensis* from the island of Samar, with which it shares the interiorly open and rather slender, oval, pit-like metasternal pseudo-foramina of both sexes. Females are merely separable by the slightly slenderer general shape and the on average larger size, as well as the somewhat more spinose pair of posterior pronotals, less numerous and less acute mesosternals and more distinctly medially notched and bi-lobate posterior margin of abdominal sternum VII (Fig. 9J). Moreover, these ♀ often have a light cream-coloured or whitish medio-longitudinal streak on the thoracic terga, which is rarely observed in *samarensis*. Males are well recognised by the reddish or rusty brown lateral surfaces of the mesonotum (Fig. 10D) and dark blackish purple ventral surfaces of the femora (Fig. 9E), which readily separate them form the ♂ of *samarensis* and other congenerics. In addition to the averagely larger size, ♂ of *cavernosus* may also be separated from those of *samarensis* by the more narrowed posterior margin of the anal segment (Fig. 9G), smaller and rounded epiproct, less arched terminal hook of the vomer (Fig. 72A) and narrower posteromedian notch of the poculum. Also, the eggs are remarkably similar to those of *cavernosus* and may only be distinguished by the somewhat less narrow anterior end of the capsule and relatively larger posterolateral extensions of the micropylar plate (Fig. 73E-F).

Variability. – Despite moderate variability of the body armature and cephalic supination, considerable variability is seen in the colouration. This concerns to ♀ in particular which are mostly various tones of drab and brown, but can more rarely be dark green or mixtures of brown and green tones. There often is a light cream to beige medio-longitudinal streak along the pro, meso- and metanotum and basal abdominal terga (e. g. Fig. 10E). The ♀ from the Mahaplag municipality, Leyte Island in the authors collection even has the pale streak running along the whole dorsal body surface with exception of the head. In all other morphological aspects and armature this specimen fully agrees with the numerous examples from Luzon and Rapu Rapu. No such strong chromatic variability is seen in ♂, which are mostly olive to mid brown and almost exceptionally have a more or less pronounced pale yellow to cream-coloured medio-longitudinal stripe along the dorsal body surface. The cephalic supination and body

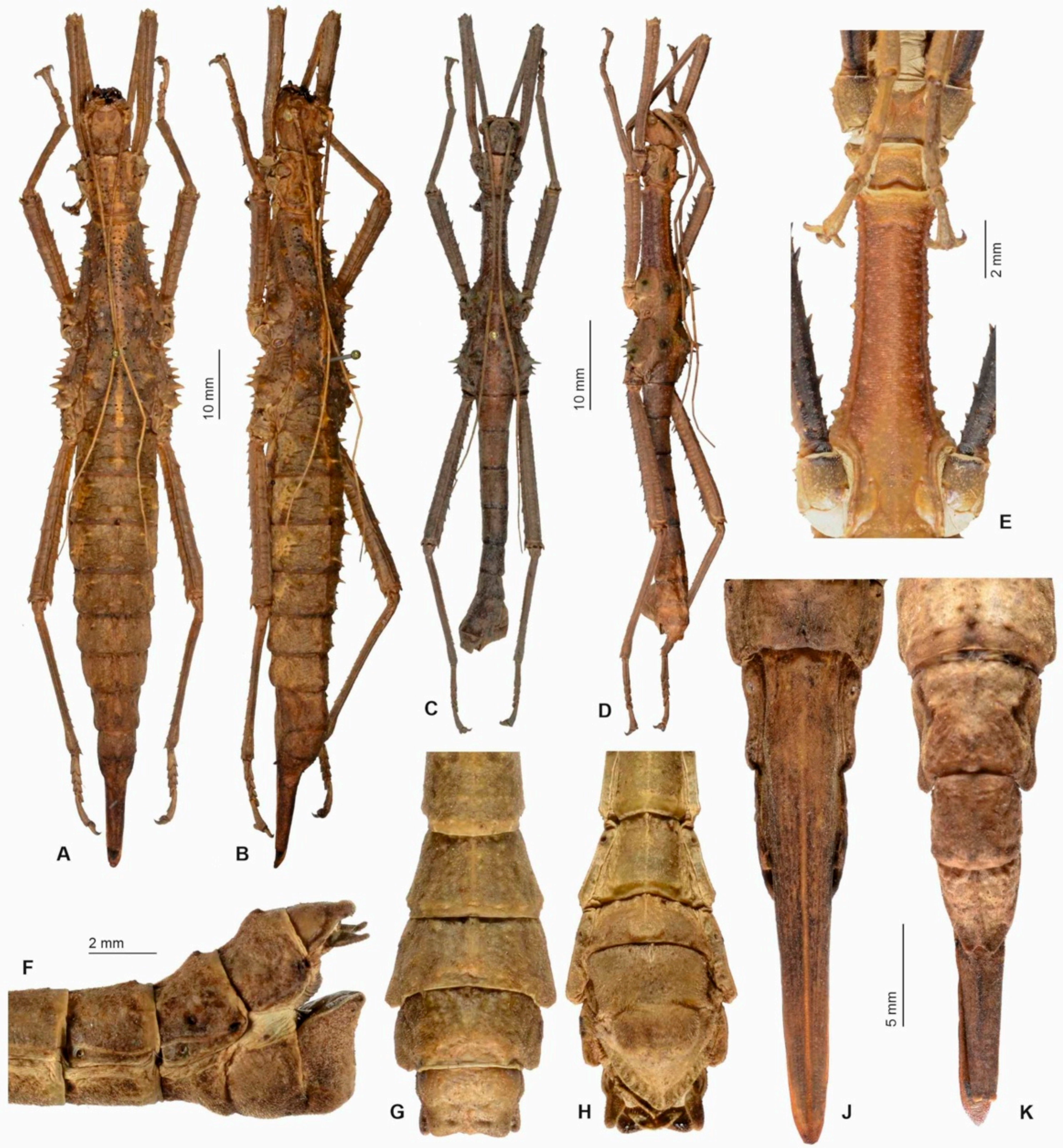

Fig. **9**. *Brasidas cavernosus* (Stål, 1877) **n**. **comb**.

– **A**. ♀ dorsal view (reared from SE-Luzon, Bicol, Sorsogon, Mount Pulog) [FH 0768-1]. – **B**. ♀ dorsolateral view (reared from SE-Luzon, Bicol, Sorsogon, Mount Pulog) [FH 0768-1]. – **C**. ♂ dorsal view (S-Luzon, Prov. Sorsogon) [FH 0768-42]. – **D**. ♂ dorsolateral view (S-Luzon, Prov. Sorsogon, Pocdol Mts.) [FH 0768-40]. – **E**. Mesosternum of ♂ (S-Luzon, Prov. Sorsogon, Pocdol Mts.) [FH 0768-40]. – **F**. Terminalia of ♂ in lateral view (reared from SE-Luzon, Bicol, Sorsogon, Mount Pulog) [FH]. – **G**. Terminalia of ♂ in dorsal view (reared from SE-Luzon, Bicol, Sorsogon, Mount Pulog) [FH]. – **H**. Terminalia of ♂ in ventral view (reared from SE-Luzon, Bicol, Sorsogon, Mount Pulog) [FH]. – **J**. Terminalia of ♀ in dorsal view (reared from SE-Luzon, Bicol, Sorsogon, Mount Pulog) [FH]. – **K**. Terminalia of ♀ in ventral view (reared from SE-Luzon, Bicol, Sorsogon, Mount Pulog) [FH].

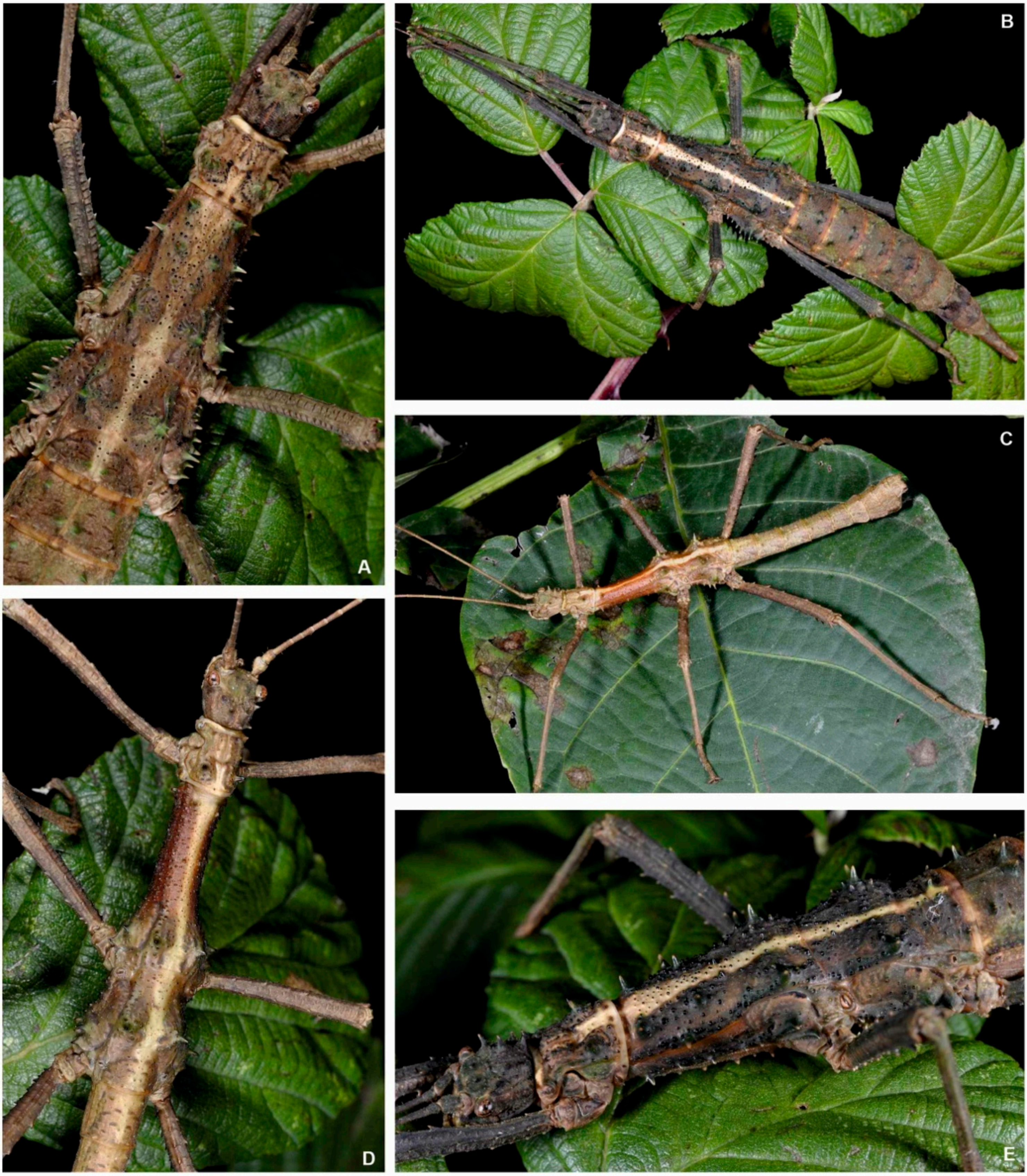

Fig. 10. *Brasidas cavernosus* (Stål, 1877) **n**. **comb**. live captive reared insects from Rapu Rapu Island, Albay Province. – **A**. Head and thorax of ♀. – **B**. ♀ with a distinct light cream medio-longitudinal dorsal streak on thorax. – **C**. ♂. – **D**. Head and thorax of ♂. – **E**. Head and thorax of ♀ seen in Figure A.

armature varies from mid to dark green in both sexes. The metasternal foramina fairly distinct and basically semi-circular. Body lengths: ♀ 96.5-114.0 mm, ♂ 66.0-72.5 mm.

Remarks. – The specimens from Surigao, North Mindanao recorded by Rehn & Rehn (1939: 449) and Redtenbacher (1906: 39) are misidentified and likely to be *B. viscayanus*. Unfortunately, neither specimen could be closely examined for this study. The ♂ and two ♀ recorded and illustrated by Rehn & Rehn (1939: 449, pl. 31: 8, 36: 38, 38: 44) from the island of Siargao off the north-eastern coast of Minadanao are also misidentified and here described as *Brasidas rehni* **n**. **sp**. Thus, both these geographic records do not relate to *cavernosus* and hence are not listed in the distribution of *cavernosus* below.
This is the second largest species in the genus and among the largest representatives of the whole of Obriminae. Two culture stocks of this species have been introduced to Europe, both collected by Thierry Heitzmann (Philippines) in 2011. One stock originated from Mount Pulog, Sorsogon Province, SE-Luzon and was included on the Phasmid Study group culture-list as culture No. 377. The other stock originated from four couples collected on the island of Rapu Rapu and was given the culture No. 361. Both stocks haven proven easy to maintain in culture and accept a variety of alternative food plants, including bramble and raspberry (*Rubus* spp., Rosaceae), roses (*Rosa* spp., Rosaceae), hazel (*Corylus avellana*, Betulaceae), salal (*Gaultheria shallon*, Ericaceae) and different Araceae. Thus, it is believed that *B. cavernosus* is also polyphagous in its natural habitats.

Distribution. – "Philippines" [NHRS, NHMW]. Luzon [NHMW]. Central Luzon, Province Manila [MNHN]. Southeast Luzon, Bicol Region, Province Sorsogon (Pocdol Mountains, Mount Pulog National Park, Mount Pulog [FH, RBINS]; Mount Bulusan [FH]); Province Aurora (Sierra Madre, Dingalan 230 m [FH]); Province Albay (Rapu-Rapu Island [FH, RBINS]). Eastern Visayas, Province Leyte, Leyte Island (Mahaplag [FH]).

Brasidas lacerta (Redtenbacher, 1906) **n**. **comb**.

(Fig. 11-14, 70E-F, 72B & 73A-B)

Obrimus lacerta Redtenbacher, 1906: 39.

LT (by present designation), ♀: Coll. Br.v.W., Mindanao, Dr. Dohrn; det. Redtenb. *Obrimus lacerta*; 18.440 [NHMW] [**Not**: **PLT**, ♂ (penultimate instar): Coll. Br.v.W., Philippinen, Schneider; det. Redtenb. Obrimus lacerta; 14.470 [NHMW] – this is *B. cavernosus* (Stål, 1877).

PLT, ♂: Type; Luzon, Jagor; *Obrimus perforatus* Redt. n. sp.; 3220, Zool. Mus. Berlin [MNHU] – this is *B. bakeri* Rehn & Rehn, 1939].

n. **comb**.

- Bruner, 1915: 35.

Euobrimus lacerta, Rehn & Rehn, 1939: 449.

- Brock, 1998: 37. (Type data)
- Zompro, 2004: 216.
- Otte & Brock, 2005: 137.
- Zompro, 2005: 269. (Type data)
- Brock & Büscher, 2022: 521.

= *Brasidas acanthoderus* Rehn & Rehn, 1939: 443, pl. 33: 24.

HT, ♀ (juvenile): Philippines, Mindanao, Sept 1917, C.M.W.; MCZC, Type; *Brasidas acanthoderus* Rehn + Rehn, Type [MCZC].

n. **syn**.

- Zompro, 2004: 215.
- Otte & Brock, 2005: 74.
- Brock & Büscher, 2022: 521.

= *Euobrimus atherura* Rehn & Rehn, 1939: 446, pl. 33: 22, 35: 31.

HT, ♂ (penultimate instar): Baroring R., Mt. Apo, Mindanao, P.I.; Alt 7000 ft., XI.9.1930 (C.F. Clegg); *Euobrimus atherura* Rehn + Rehn Type, 1298 Hebard Cln; Data Base Serial No. assigned as Type No. September 2008, Type #9120 [ANSP];

AT, ♀ (penultimate instar): Calian, Davao Prov., Mindanao, P.I. (C.F. Clegg), V.29.1930; *Euobrimus atherura* Rehn + Rehn Paratype, Hebard Cln; Data Base Serial No. assigned as Type No. September 2008, Type #9120 [ANSP].

n. **syn**.

- Otte, 1978: 79. (Type data)
- Zompro, 2004: 217, fig.
- Otte & Brock, 2005: 137.
- Brock & Büscher, 2022: 521.

= *Euobrimus cleggi* Rehn & Rehn, 1939: 455, pl. 33: 21, 37: 40.

HT, ♂: Sibulan R., Mt. Apo, Mindanao, P.I.; Alt 2000 ft. XI.11.1930 (C.F. Clegg); *Euobrimus cleggi* Rehn + Rehn Type, 1252 Hebard Cln; Data Base Serial No. assigned as Type No. September 2008, Type #9121 [ANSP];

AT, ♀: Sibulan R., Mt. Apo, Mindanao, P.I.; Alt 2000 ft. XI.11.1930 (C.F. Clegg); Allotype, *Euobrimus cleggi* Rehn + Rehn Paraype, 1252 Hebard Cln; Data Base Serial No. assigned as Type No. September 2008, Type #9121 [ANSP].

n. **syn**.

- Otte, 1978: 79. (Type data)
- Zompro, 2004: 216.
- Otte & Brock, 2005: 137.
- Brock & Büscher, 2022: 521.

= *Euobrimus dohrni* Rehn & Rehn, 1939: 450.

LT (by present designation), ♂: Mindanao; *Obrimus cavernosus* Stal; *Euobrimus dohrni* Rehn & Rehn, 1939 SYNTYPE ♂, Det. P.Brock 2009 [MIZ];

PLT, ♀: Mindanao; *Obrimus cavernosus* Stal; *Euobrimus dohrni* Rehn & Rehn, 1939 SYNTYPE ♀, Det. P.Brock 2009 [MIZ].

n. **syn**.

- Zompro, 2004: 216.
- Otte & Brock, 2005: 137.
- Brock & Büscher, 2022: 521.

Brasidas foveolatus, Zompro, 2004: 215.

- Otte & Brock, 2005: 74.
- Bollens, Krijns & Bresseel, 2010a: 8, fig.
- Bollens, Krijns & Bresseel, 2010b: 22.
- Harman, 2015: 26. (Culture stock origin)
- Hennemann et al., 2016: fig. 40.
- Brock & Büscher, 2022: 521.

= *Brasidas foveolatus asper* Rehn & Rehn, 1939: 437, pl. 34: 26.

HT, ♂: Davao, Mindanao, Baker; 8213; USNM; Type No. 53229, U.S.N.M.; *Brasidas foveolatus asper* Rehn + Rehn, Type [USNM].

n. **syn**.

- Zompro, 2004: 215.
- Otte & Brock, 2005: 74.
- Brock & Büscher, 2022: 521.

= *Brasidas montivagus* Rehn & Rehn, 1939: 440, pl. 33: 19-24.

HT, ♂ (penultimate instar): Mt. Galintan, Davao, Mindanao, P.I., May 1927, R.C. McGregor; Duyag's collection; USNM; Type No. 53227, U.S.N.M.; *Brasidas montivagus* Rehn + Rehn, Type [USNM];

AT, ♀ (penultimate instar): Mati, Davao, Mindanao, P.I.; Apr 1927, FRivera coll; USNM; Type No. 53227, U.S.N.M.; Allotype, *Brasidas montivagus* Rehn + Rehn, Paratype [USNM].

n. **syn**.

- Zompro, 2004: 215.
- Otte & Brock, 2005: 74.
- Brock & Büscher, 2022: 521.

= *Euobrimus stephenreyesi* Lit & Eusebio, 2006: 101, figs. 1a-b.

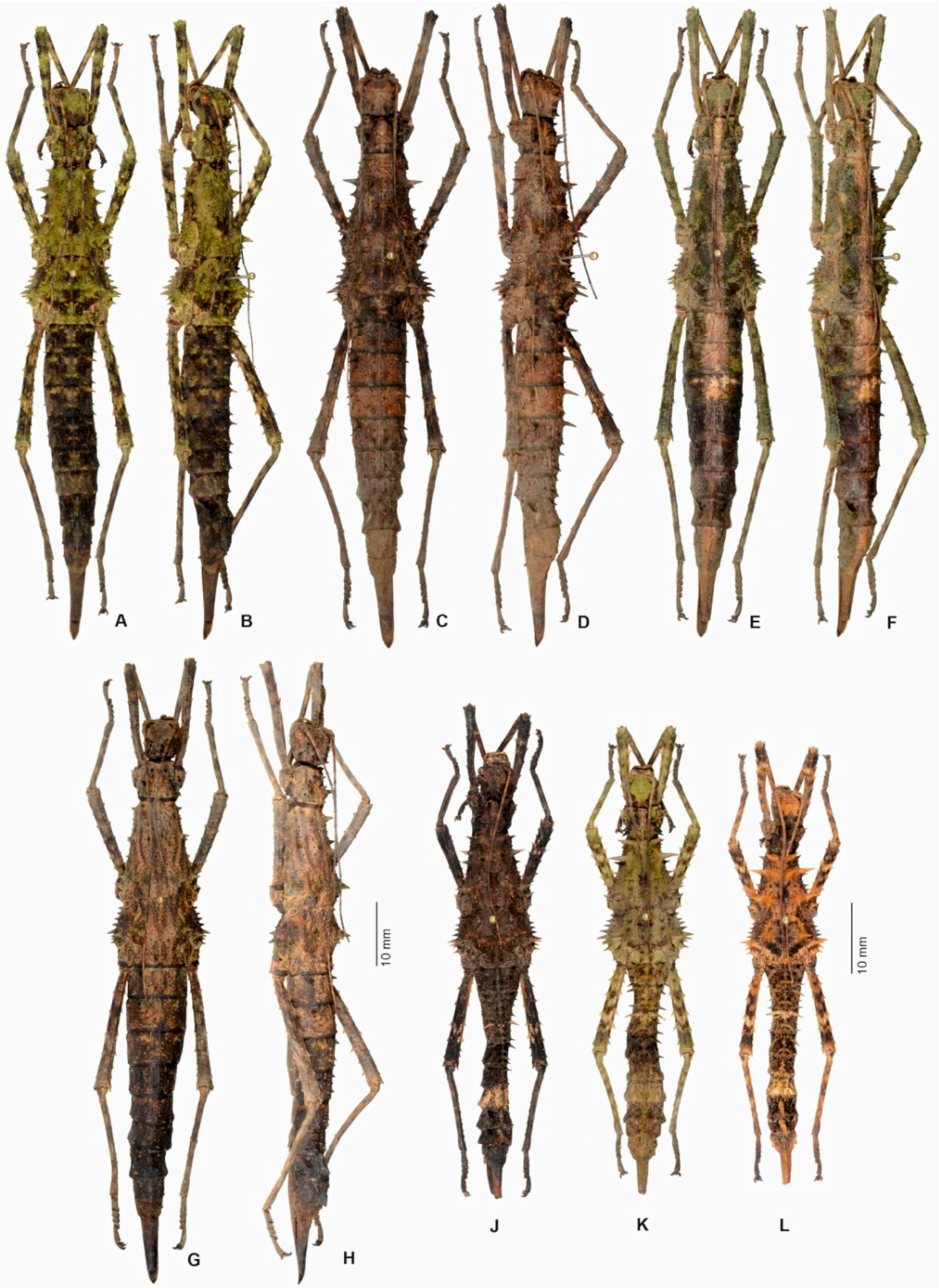

Fig. 11. *Brasidas lacerta* (Redtenbacher, 1906) **n. comb.** ♀. mature (A-H) and penultimate instar (J-L) showing intraspecific variability.

A-**B**. Dorsal and dorsolateral view of specimen from Arakan, South Cotobato Province, Mindanao [FH 0316-78]. **C**-**D**. Dorsal and dorsolateral view of specimen from Cugman, Misamis Oriental Province, Mindanao [FH 0316-67]. **E**-**F**. Dorsal and dorsolateral view of specimen from Mount Talomo, Davao del Sur Province, Mindanao [FH 0316-59]. **G**-**H**. Dorsal and dorsolateral view of specimen from Arakan, South Cotobato Province, Mindanao [FH 0316-77]. – **J**. Specimen from Mount Talomo, Davao del Sur Province, Mindanao [FH 0316-64]. – **K**. Specimen from Mount Talomo, Davao del Sur Province, Mindanao [FH 0316-62]. – **L**. Specimen from Mount Talomo, Davao del Sur Province, Mindanao [FH 0316-66].

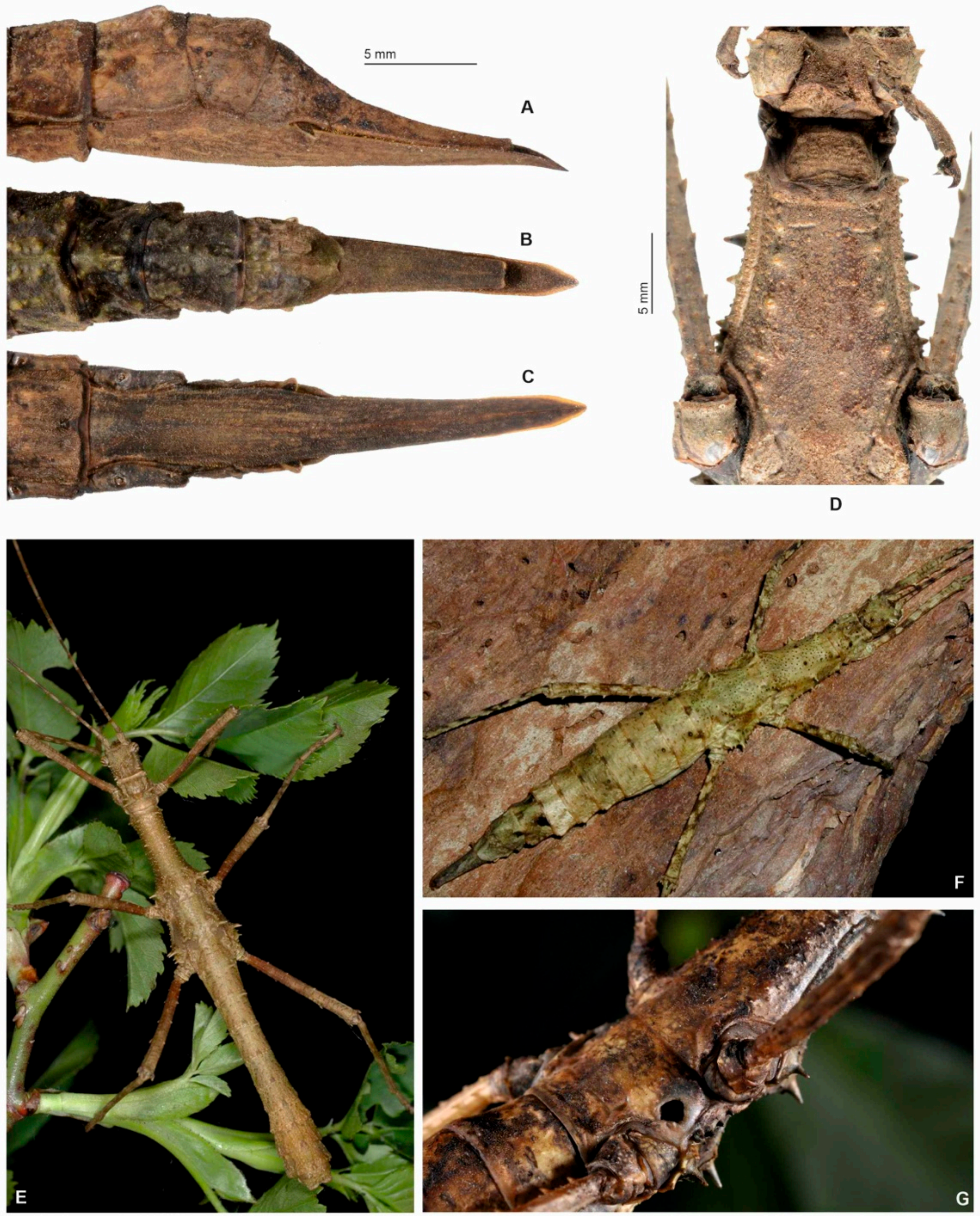

Fig. **12**. *Brasidas lacerta* (Redtenbacher, 1906) **n**. **comb**.

– **A**. Terminalia of ♀ AT of *Euobrimus cleggi* Rehn & Rehn, 1939 in lateral view (Sibulan River, Mount Apo, Mindanao) [ANSP]. – **B**. Terminalia of ♀ in dorsal view (Arakan, South Cotobato Province, Mindanao) [FH 0316-78]. – **C**. Terminalia of ♀ in ventral view (Arakan, South Cotobato Province, Mindanao) [FH 0316-78]. – **D**. Mesosternum of ♀ [FH]. – **E**. Live captive reared ♂ from Mount Apo, Mindanao [FH]. – **F**. Live captive reared ♀ from Mount Apo [FH]. – **G**. Ventral view of metasternum of live captive reared ♀ from Mount Apo showing the metasternal pits [FH].

HT, ♂: Mindanao Island: Surigao del Sur Province, Bislig IV.1977, A.N. Conception [UPLB];

PT, ♀ (juvenile): Mindanao Island: Surigao del Sur Province, Bislig IV.1977, A.N. Conception [UPLB].

n. **syn**.

[**Not**: *Euobrimus lacerta*, Krijns, 2012: 14, figs. (Rearing notes, description of egg) – misidentification, *B. cavernosus* (Stål,1877)]

[**Not**: *Euobrimus lacerta*, Harman, 2014: 20. (Culture stock origin) – misidentification, *B. cavernosus* (Stål, 1877)]

[**Not**: *Euobrimus lacerta*, Harman, 2022: 22. (Culture stock origin) – misidentification, *B. cavernosus* (Stål, 1877)]

Material examined

2 ♀ (penultimate instar): Philippinen: Mindanao Id., 12.III.1996 [FH, No's 0316-1 & 2];

13 ♀, **25** ♂, **1** gynandromorp, eggs: ex Zucht F. Hennemann 2009/10, Herkunft: Philippinen, Mindanao Id., Mt. Apo, 2008, leg. Bresseel et al. [FH, No's 0316-3 to 41, E1];

1 ♂: Philippinen, Mindanao Id., Provinz Sarangani, Kiamba, 2012 [FH, No. 0316-42];

1 ♀, **1** ♂: Philippinen, Mindanao Id., Prov. Misamis Oriental, Cugman, VI.2011 [FH, No. 0316-67 & 68];

2 ♀, **5** ♂: Philippinen, Mindanao Id., Prov. Davao del Sur, Mount Talomo, V.2011 [FH, No's 0316-43 to 49];

8 ♀, **4** ♂, **2** ♀ (immature): Philippinen, Mindanao Id., Prov. Davao del Sur, Mount Talomo, III-V.2009 [FH, No's 0316-50 to 63];

3 ♀ (immature): Philippinen, Mindanao Id., Prov. Davao del Sur, Mount Talomo, III.2010 [FH, No's 0316-64 to 66];

1 ♀: Philippinen, Mindanao Id., Provinz Zamboanga, Bayog, V.2011 [FH, No. 0316-69];

1 ♀, **1** ♂: Philippinen, Mindanao Id., Provinz Zamboanga, Bayog, XI.2011 [FH, No. 0316-70 & 99];

1 ♀, **2** ♂: Philippinen, Mindanao Id., Provinz Cotabato, Magpet, X.2009 [FH, No`s 0316-71 to 73];

3 ♂: Philippinen, Mindanao Id., Provinz Cotabato, Magpet, II.2010 [FH, No`s 0316-74 to 76];

3 ♀, **2** ♂, **1** ♂ (immature): Philippinen, Mindanao Id., Provinz Cotabato, Arakan, III.2010 [FH, No`s 0316-77 to 82];

1 ♂: Philippinen, Mindanao Id., Provinz Cotabato, Arakan, V.2011 [FH, No`s 0316-83];

1 ♀: Philippinen, Mindanao Id., Prov. Lanao del Sur, Wao, I.2012 [FH, No`s 0316-84];

1 ♂: Philippinen, Mindanao Id., Prov. Lanao del Sur, Wao, VII.2012 [FH, No`s 0316-85];

1 ♀: Philippinen, Mindanao Id., Prov. Agusan del Sur, San Agustin, III.2012 [FH, No. 0316-86];

1 ♀, **1** ♂: Philippinen, Mindanao Id., Prov. Davao del Sur, Tamayog, III.2010 [FH, No`s 0318-87 & 88];

1 ♀, **1** ♂: Philippinen, Mindanao Id., Prov. Davao del Sur, Kapatagan, III.2010 [FH, No`s 0316-89 & 90];

1 ♂: Philippinen, Mindanao Id., Prov. Davao del Sur, Kapatagan, VIII. 2012 [FH, No 0316-91];

1 ♂: Philippinen, Mindanao Id., Prov. Davao del Sur, Marilog District, Gumitan, III.2010 [FH, No 0316-92];

1 ♂: Philippinen, Mindanao Id., Prov. Agusan del Sur, Loreto, III.2012 [FH, No 0316-93];

1 ♂: Philippinen, Mindanao Id., Prov. Cotabato, Kidapawan, VI.2010 [FH, No 0316-94];

1 ♂: Philippinen, Mindanao Id., Prov. Misamis Oriental, Cagayan de Oro, I.2013 [FH, No 0316-95];

1 ♂: Philippinen, Mindanao Id., Prov. South Cotabato, Mount Parker, III.2013 [FH, No 0316-96];

1 ♂ (immature): Philippinen, Mindanao Id., Prov. Davao de Oro, Compostela Valley, Monkayo, III.2012 [FH, No 0316-97];

1 ♂ (mmature): Philippinen, Mindanao Id., Prov. Agusan del Sur, Borbon, II.2012 [FH, No 0316-98];

3 ♀, **5** ♂, **2** ♀ (juvenile): Philippines, Mindanao, Tamapakan, Ta'al Falls, Apr. 2011, leg. Bresseel, Bellemans, Vangamberen [RBINE];

3 ♀, **2** ♂, **3** ♀ (penultimate instar), **2** ♂ (penultimate instar): Philippines, Mindanao, South Cotabato, Mt. Parker, Apr. 2010, leg. Bresseel, Bollens, Krijns [RBINS];

1 ♀ (juvenile): Philippines, Mindanao, Cotabato, Arakan. I.2010 [RBINS];

2 ♀, **4** ♂, **3** eggs: Philippines, Mindanao, Davao de Oro, Nabunturan, IV.2009, leg. Bresseel, Caluwé & Bushell [RBINS];

2 ♀, **6** ♂, **3** eggs: Philippines, Mindanao, Mt. Apo, Lake Agco Area, Apr, 2010 [RBINS];

4 ♂: Philippines, Mindanao, Mt. Apo, Lake Agco Area, Apr, 2010; ex breeding J. Bresseel 2011 [RBINS];

1 ♀, **1** ♂: Philippines, Mindanao, Agusan Del Norte Bayugan, VI. 2013, local collector, Gift B. Kneubühler [RBINS];

1 ♀, **1** ♂: Philippines, Mindanao, Agusan Del Norte Bayugan, VI. 2013, local collector, Gift B. Kneubühler [RBINS];

1 ♂ (penultimate instar): Philippines, Mindanao, Agusan Del Sur, Esperanza, III.2013, local collector, Gift B. Kneubühler [RBINS];

1 ♀: Philippines, Mindanao, Agusan Del sur, Esperanza, IV.2013, local collector, Gift B. Kneubühler [RBINS];

1 ♀, **1** ♂: Philippines, Mindanao, Agusan Del sur, Borbon, IV.2013, local collector, Gift B. Kneubühler [RBINS];

2 ♀: Philippines, Mindanao, Bukidnon, Cabanglasan, VII.2013, local collector, I. Lumawig [RBINS];

1 ♀: Philippines, Mindanao, Bukidnon, Cabanglasan, III.2013, I. Lumawig, gift B. Kneubühler I.G. 32.613 [RBINS];

1 ♂ (penultimate instar): Philippines, Mindanao, Bukidnon, Panamokan, IX.2013, local collector, I. Lumawig [RBINS];

2 ♀: Philippines, Mindanao, Bukidnon, Intavas, III,2013 [RBINS];

1 ♀, **2** ♂: Philippines, Mindanao, Bukidnon, Intavas, III.2013, I. Lumawig, gift B. Kneubühler I.G. 32.613 [RBINS];

1 ♂: Philippines, Mindanao, Bukidnon, Valencia, II.2013, I. Lumawig, gift B. Kneubühler I.G. 32.613 [RBINS];

1 ♀, **1** ♂: Philippines, Mindanao, Bukidnon, Valencia, X.2012, F. Seow-Choen & I. Abercrombie [RBINS];

1 ♀: Philippines, Mindanao, Bukidnon, Dominorog, IX.2011 [RBINS];

1 ♂: Philippines, Mindanao, Bukidnon, Dominorog, Mt. Kalatungan, IX.2011 [RBINS];

1 ♀: Philippines, Mindanao, Surigao del Sur, Barobo, dec. 2013, I. Lumawig [RBINS];

2 ♀: Philippines, Mindanao, Lanao Del Sur, Wao, IV.2013 [RBINS];

2 ♀, **2** ♂, **1** juvenile: Philippines, Mindanao, Nabunturan, ex culture Holger Dräger 2014 [RBINS].

Differentiation. – This very polymorphic and common species is in all aspects most similar to the second common Mindanaoan species *B. viscayanus*, but it is generally smaller with the body length of ♀ usually < 90.0 mm and that of ♂ < 60.0 mm, and both sexes are somewhat stockier in general shape and have the metasternal pseudoforamina comparatively larger and more oval in shape (Fig. 70E-F). Females may also be distinguished from those of *viscayanus* by having the mesonotum narrowing anteriorly and slightly shorter (roughly rectangular in *viscayanus*), the posterior meso- and metanotals less spinose but ± composite, the mesosternals less in number, notably smaller and rather obtuse (Fig. 12D), the triangular posteromedian indention of the anal segment smaller and more wide-angled (*ca.* 110°, Fig. 12B), and the posterior margin of abdominal sternum VII more inflated and more deeply indented medially with

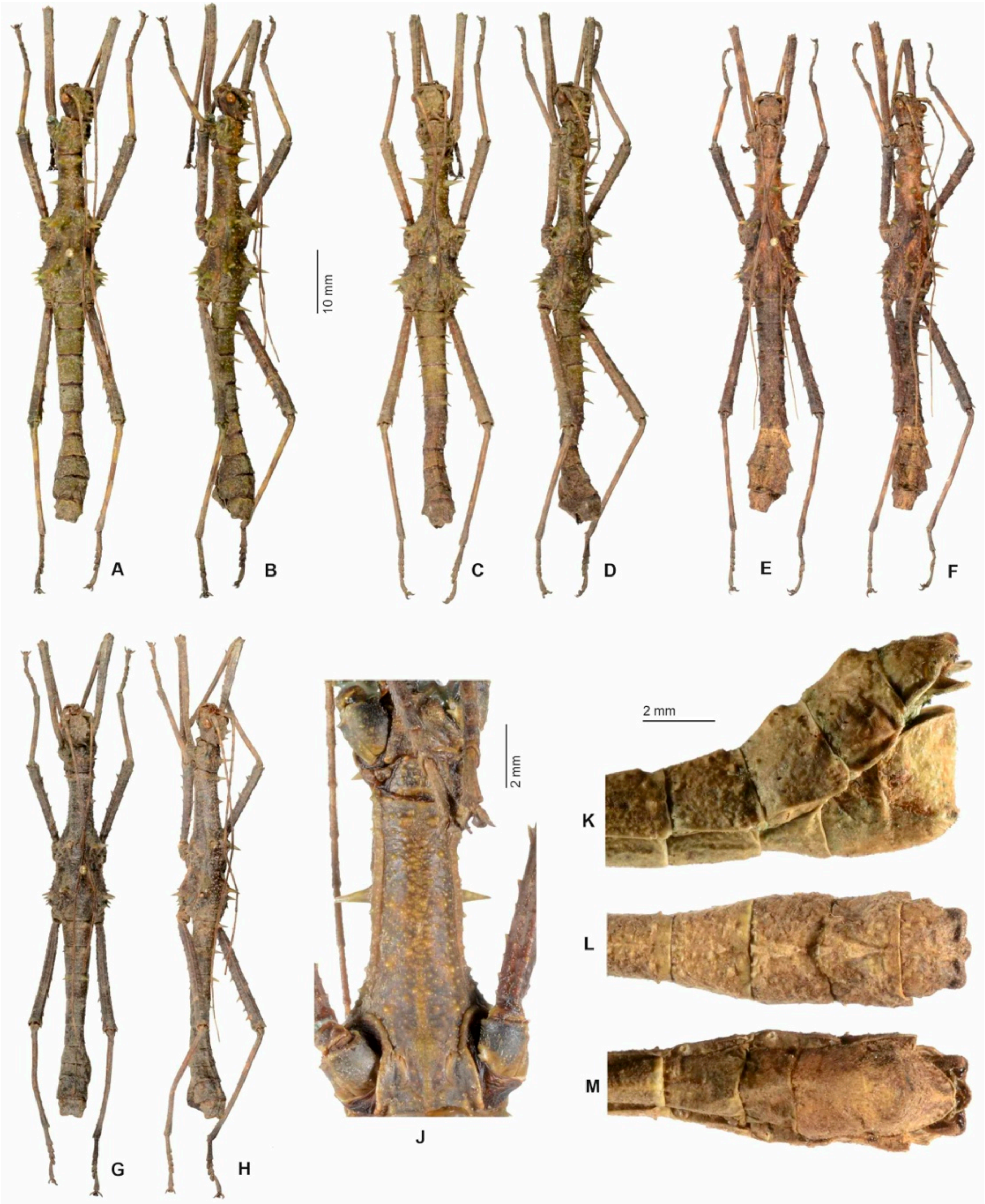

Fig. **13**. *Brasidas lacerta* (Redtenbacher, 1906) **n**. **comb**. ♂ with A-H showing intraspecific variability.

A-**B**. Specimen from Arakan, South Cotobato Province, Mindanao [FH 0316-81]. **C**-**D**. Specimen from Arakan, South Cotobato Province, Mindanao [FH 0316-83]. **E**-**F**. Specimen from Bayog, Llano del sur Province, Mindanao with very prominent thoracic and abdominal spination [FH 0316-99]. **G**-**H**. Specimen from Magpet, Cotobato Province, Mindanao [FH 0316-73]. – **J**. Mesosternum of specimen from Arakan, South Cotobato Province, Mindanao [FH]. – **K**. Terminalia in lateral view (reared from Mount Apo) [FH]. – **L**. Terminalia in dorsal view (reared from Mount Apo) [FH]. – **M**. Terminalia in ventral view (reared from Mount Apo) [FH].

the pit of the praeopercular organ comparatively larger (Fig. 12C). Males can be separated from those of *viscayanus* by the relatively shorter abdominal terga (tergum IV 1.65x *vs* 1.75x longer than wide), the comparatively less pronounced and slenderer meso- and metapleural spine, subobsolete medio-longitudinal keel of the meso- and metasternum (Fig. 13J, 70F), slightly less inflated and less distinctly bi-lobed posterior margin of the anal segment (Fig. 13L), relatively larger epiproct and noticeably less numerous and larger ventral teeth or spines of the meso- and metafemora.

Variability. – This is a highly polymorphic species that shows remarkable intraspecific variability in size, colouration and armature of the head, body and legs (Fig. 11, 13). But even the general shape shows slight variability within individual populations, which was revealed by captive breeding. A large number of specimens is available for examination from the authors collection and that of RBINS, which originate from a good variety of localities throughout the distributional range of *B. lacerta*. It has become obvious, that certain morphological variations cannot be clearly linked to individual localities or populations. Almost all variable traits examined appear to occur within each population to a variable degree, but for fully confirming this observation even more material from a wider range of localities would be needed. The specimens at hand however allow a fairly good overview of the range of intraspecific variability and render a critical review of the synonymies of *B. lacerta*. The strong intraspecific variability and numerous synonyms established herein are largely supported by molecular data (Bank *et al.,* 2021), which have shown all sampled specimens from a total of eight localities throughout Mindanao to be conspecific and to represent the same polymorphic species. The range of morphological variability is summarized below.

Remarkable variability can be observed particularly in the spination of the body of both sexes, with specimens basically ranging from being rather weakly to strongly armed for members of Obriminae. Generally, all spines show a notable range of development and size. In ♂ (Fig. 13) the medio-lateral mesonotals and post-median mesonotals are either completely wanting, either or both pairs are merely represented as conical tubercles, or either or both pairs are strong and prominent spines. The example from Bayog even has a small pair of post-median mesonotal spines. The posterosterior mesonotals and metanotals are mostly simple but may be bi-fid (several of the examples from Mount Talomo) or even composite (specimens from Arakan, Cugman and Bayog). The posterior pronotals are mostly simple but can be bi-fid or even compound like in the holotype of *stephenreyesi* (e. g. single specimens from Mount Talomo, Arakan, Cugman or Kidapawan). The example from Bayog even has a pair of fairly distinct anterior pronotals, which are about two-thirds the size of the posteriors. The latero-anterior of abdominal terga II-V range from small tubercles, and in such weakly armed specimens may even be completely missing on tergum V (e. g. a specimen from Mount Talomo), to distinct and slender, upright spines (e. g. some specimens from Mount Talomo, Arakan, Cugman and Bayog). The two examples from Bayog and Cugman even have the abdominal terga set with additional small paired spines, a small pair of medial on the median segment and terga VIII-IX with a triangular, tooth-like posteromedian lobe (like in the holotype of *stephenreyesi*). The same specimens also have a few small teeth on the dorsal carinae of the meso- and metafemora, whereas these are smooth in most other specimens examined. Two of the captive reared specimens in the authors collection are notably stockier in shape than all other specimens at hand, having the notably less than 2x the length of the pronotum. Females (Fig. 11) generally show variability in the same aforementioned spines of ♂. However, a much larger percentage of specimens have a fairly distinct pair of anterior pronotals that are variable in size. Several examples from Mount Talomo show a small pair of post-median mesonotals, whereas these are missing in the great majority of the specimens examined. While the abdominal terga are mostly unarmed with the exception of a variably sized pair of latero-anteriors, some examples from Mount Talomo, Arakan and the ♀ from Cugman have terga II-VII with additional small to moderately sized medials as well as first and second paired posteriors. Females in particular also show strong chromatic variability ranging from various tones of beige, drab and brown over mid to dark green and olive to dark brown and usually are flecked with darker brown. The major spines of the head and body are green even in brown specimens. Abdominal tergum VII is light cream-coloured, straw-coloured or whitish in about half of the specimens at hand and almost all have a variably shaped, diagonal directed velvety black antero-lateral spot or marking on tergum VIII. The chromatic variability is less distinct in ♂, which however may have a washed pale cream-coloured medio-longitudinal streak along the dorsal surface of the thorax (Fig. 14E). Body lengths: ♀ 73.5-91.5 mm, ♂ 48.0-57.0 mm.

Remarks. – The incredible intraspecific variability of *B. lacerta* in various aspects and notably more prominently developed spination in immature specimens has caused the description of a total of eight synonymic species, whose synonymy could be uncovered by the examination of a large series of specimens from various localities throughout the island of Mindanao in the authors collection and that of RBINS as well as captive breeding over several generations. The three syntypes upon which Redtenbacher described *lacerta* actually represent three distinct species. Thus, the selection of a lectotype has become necessary to provide a definition and stability for Redtenbacher's species and allowing to synonymise other taxa under *lacerta*. The adult ♀ from "Mindanao" in the collection of NHMW is here chosen as the lectotype for the following reasons. The ♂ syntype from Luzon in NHMW is a penultimate instar nymph of *Obrimus cavernosus* Stål, 1877 and since it is immature, would have been an unfortunate choice for being the lectotype. The adult ♂ syntype from Luzon in the collection of MNMS is *Brasidas bakeri* Rehn & Rehn, 1939 and since this species was described from several adult specimens with exact collecting data it is apparently more meaningful to retain *bakeri* as a valid species, rather than synonymising it with *lacerta*.

The following seven species are here synonymised with *B. lacerta*. *Brasidas acanthoderus* Rehn & Rehn, 1929 is a ♀ nymph with strongly developed body armature, compound posterior meso- and metanotals and strong median and medio-lateral mesonotals (**n. syn**.). It agrees well with juvenile examples from Mount Talomo and Kadapawan in the authors collection. *Euobrimus atherura* Rehn & Rehn, 1939 are two penultimate instar nymphs that have the thoracic supination averagely developed and basically agree to most of the captive reared material from Mount Apo (**n. syn**.). *Euobrimus cleggi* Rehn & Rehn, 1939 was described from an adult ♂ and ♀, both of which have the supination rather weakly developed, the ♀ agreeing well with captive reared specimens from Mount Apo and the ♂ being of a fairly stocky shape but clearly within the range of captive reared Mount Apo stock (**n. syn.**). *Euobrimus dohrni* Rehn & Rehn, 1939 is a name that was introduced for two Mindanaoan specimens recorded as *Obrimus cavernosus* by Dohrn (1910: 377). For providing stability of the taxon and enabling proper synonymisation, the ♂ is here selected as the lectotype. Morphologically, the ♀ mostly corresponds to the lectotype of *lacerta* and the ♂ is a specimen with weakly developed body armature and just small latero-anterior spines on abdominal terga II-IV (**n. syn**.). This synonym was also revealed by a molecular approved presented by Bank et al. (2021: 15). *Brasidas foveolatus asper* Rehn & Rehn, 1939 is merely a typical ♂ *lacerta* with moderately developed body spination (**n**. **syn**.). *Brasidas montivagus* Rehn & Rehn, 1939 are two roughly half-grown immature specimens with moderately developed armature but fairly distinct mesonotal medials and medio-laterals (**n**. **syn**.). Finally, *Euobrimus stephenreyesi* Lit & Eusebio, 2006 is a ♂ with very strongly developed body armature, compound posterior meso- and

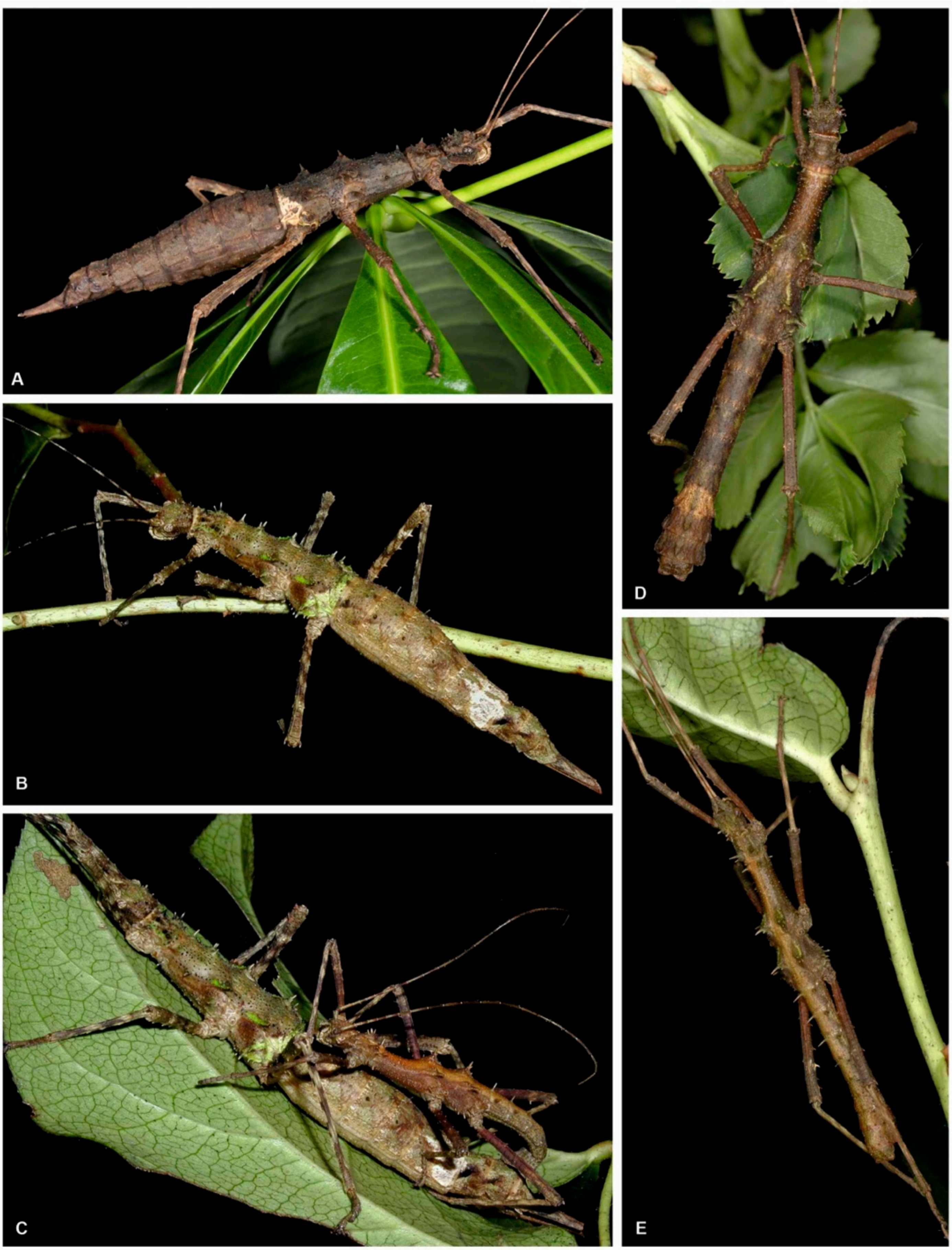

Fig. 14. *Brasidas lacerta* (Redtenbacher, 1906) **n. comb**. live captive reared insects from Mount Apo, South Cotobato Province, Mindanao. – **A**. Uniformly dark brown ♀ with a distinct light cream lateral marking on median segment. – **B**. Greenish light brown ♀ with whitish mottling on abdominal abdominal tergum VII. – **C**. Mating couple. – **D**. Plain dark brown ♂. – **E**. Light brown ♂ with an ochraceous medio-longitudinal dorsal streak on body and distinctly red femoral bases.

metanotals and strong median and medio-lateral mesonotals (**n. syn.**). It agrees well with examples from Mount Talomo and Kadapawan in the authors collection.

Culture stock of this species has been introduced to Europe in 2008 and originated from Nabunturan and Lake Agko at Mount Apo in southeast Mindanao. It was included and the Phasmid Study Group culture-list as culture No. 301 and is since being successfully reared. Culturing is pretty easy in humid conditions and at least bramble and raspberry (*Rubus* spp., Rosaceae), roses (*Rosa* spp., Rosaceae), hazel (*Corylus avellana*, Betulaceae), oaks (*Quercus* spp., Fagaceae) and ivy (*Hedera helix*, Araliaceae) are frequently accepted as alternative food-plants. Therefore, *B. lacerta* is believed to be polyphagous also in its natural habitats. The egg is illustrated in figures 73A-B.

Distribution. – Mindanao, endemic. Province Cotabato (Kidapawan [FH]; Magpet [FH]); Province South Cotabato (Mount Apo, Baroring River [ANSP]; Mount Apo, Libulan River 2000 ft. [ANSP]; Mount Apo, Lake Agco Area [RBINS]; Mount Parker [RBINS]; Arakan [FH, RBINS]; Tampakan, Ta'al Falls [RBINS]); Province Bukidnon (Tangeolan [ANSP]; Cabanglasan [RBINS]; Panamokan [RBINS]; Intavas [RBINS]; Valencia [RBINS]; Dominorog [RBINS]); Province Davao (Davao [MCZC]; Calian [ANSP]; Mati [USNM]; Impulatao [Bank *et al.*, 2021]); Province Davao Oriental (Mount Galintan [USNM]; Mount Hamiguitan [Bank *et al.*, 2021]); Province Davao del Sur (Davao [USNM]; Mount Talomo [FH]; Kapatagan [FH]; Tamayong [FH]; Gumitan [FH]); Province Davao de Oro (Nabunturan [FH, RBINS]; Compostela Valley, Monkayo [FH]); Province Surigao del Sur (Bislig [UPLB]; Barobo [RBINS]; Wao [RBINS]); Province Lanao del Sur (Wao [FH]; Bayog [FH]; "Frankfort" Bumbaran [Bank *et al.*, 2021]); Province Agusan del Sur (Loreto [FH]; Borbon [FH]; San Agustin [FH]; Esperanza [RBINS]; Borbon [RBINS]); Province Agusan del Norte (Bayugan [RBINS]); Province Misamis Oriental (Cugman [FH]; Cagayan de Oro [FH]); Province Sarangani (Kiamba [FH]); Province Zamboanga (Bayog [FH]).

***Brasidas malaki* n. sp.**

(Fig. 15)

ZooBank: https://zoobank.org/906ECB2F-F7C1-4404-810C-4CF31A3102BD

HT, ♂: Coll. I.R.Sc.N.B., Philippines, Samar 2009, leg. R. Cabale [RBINS].

Differentiation. – The ♂ of this distinctive species (the only sex known) comes morphologically closest to that of *B. manobo* **n. sp.** from Mindanao with which it shares the large posterior meso- and metanotals as well as meso- and metapleurals. It may however be separated by the characteristic and rather uniformly green colour with only the abdomen brown (Fig. 15A-B), somewhat stockier shape, different terminalia and having the posterior meso- and metanotals and supra-coxals of the meso- and metapleurae comparatively much stronger and conical in shape Fig. 15H). The distinctive colouration and rather shallow, semi-cingulate metasternal pseudo-foramina (Fig. 15J) also separate this species from the ♂ of all other known congenerics.

Etymology. – The name (*malaki* Filipino = big) refers to the fairly large size and stocky shape of the ♂ of this distinctive new species. Neuter.

Description

The following description is based on the unique dried holotype, which however seems to have the colour very well preserved. Unfortunately, the specimen lacks both antennae except for the right scapus as well as the left scapus and pedicellus.

♂ (Fig. 15)

Form and colouration. – Size large (body length 70.0 mm) and form rather stocky for the genus with the elements of armature poorly developed but the posterior meso- and metanotals as well as meso- and metapleurals very strong if compared to congenerics; body surface unevenly granular and rugulose. Head and thorax dark green dorsally, abdomen fuscous; ventral body surface ochraceous but the mesosternum with a greenish wash (Fig. 15C). Largest elements of armature tipped with apple green. Limbs mid brown with a slight olive wash dorsally and laterally and a rusty hue ventrally.

Head. – Subquadrate, slightly narrowing towards the posterior (Fig. 15G) with vertex rather flattened; whole surface unevenly tuberculose (Fig. 15H). Supra-antennals small, the supra-orbitals more pronounced and conical and vertex with a row of about six unequal small supra-orbitals as well as four slightly enlarged, conical occipital medials. The median and lateral coronals more pronounced than all other cephalic tubercles, obtusely conical in shape and the lateral coronals the largest of all tubercles. Genae with four small and unequal gulars. Eyes projecting more than hemispherical and their diameter corresponding to a little less than half the length of genae. Scapus compressed dorsoventrally, broad and subrectangular in outline, pedicellus cylindrical and notably shorter.

Thorax. – Pronotum about as long but slightly wider than head and with the anterior margin somewhat deflexed, the pre-median portion slightly narrowed and the posterior margin rounded; notably longer than wide (Fig. 15G). Transverse median sulcus curved and distinctly impressed; anterior margin with weakly developed, low anterior mesals and somewhat more conical antero-lateral tubercles; the anterior portion only with low and indistinct anterior and posterior mesals and anteriors and the posterior portion with a pair of strong, roundly conical but rather low posteriors (Fig. 15H). Mesothorax roughly parallel-sided with the posterior one-quarter strongly widened and inflated; about 2.8x longer than prothorax. Mesonotum unevenly and sparsely granular; close to anterior margin with a low and obtusely conical pair of anterior mesonotals; the poster mesonotals very strong, conical, acute and projecting by about the height of notum (Fig. 15H); at the base surrounded by 3-4 small tubercles and accompanied by a more pronounced spiniform tubercle intero-posteriorly. Posterior metanotals similar but slightly larger and with the intero-posterior tubercle more pronounced (Fig. 15H); metanotum otherwise unarmed and molariform in outline. Mesopleurae with a moderate conical antero-lateral, and about six widely spaced low and obtuse tubercles; the mesopleural very prominent and basically similar in size and shape to posterior mesonotals. Metapleurae roundly deflexed and armed with six short and rather obtuse spines; the metapleural large and slenderer than mesopleurals. Sensory areas of prosternum distinct; probasisternum with some scattered node-like granules. Mesosternum finely transversely sulcate and smooth except for five rather low and tuberculate mesosternals as well as a few intercalated granules along lateral margins. Metasternum only with three small tuberculiform metasternals; the foramina rather large, moderately deep, open interiorly and oval in shape (Fig. 15J).

Abdomen. – Median segment narrow, almost semi-circular in shape and set with about ten node-like swellings that are positioned along the anterior and lateral margins; a very low pair of medial granules present. Segments II-IV slightly increasing and narrowing, V-VII decreasing in length and slightly widening; V narrowest, roughly parallel-sided and about 1.5x longer than wide. All terga with a low medio-longitudinal bulge, II-IV each with two pairs of low medial granules and VII-IX each with a row of low posterior tubercles. Sterna II-VII smooth. Terga VIII and IX distinctly transverse. Anal segment with anterior portion roundly deflexed and the posterior portion notably narrowed; posterior margin bilobed with a narrow median indention; dorsal surface with a small pair of median impressions and a large, transverse depression near each posterolateral angle (Fig. 15E); the anterior portion with some scattered granules and the lower surface of the posterior margin with several black denticulations. Epiproct triangular and scarcely projecting beyond posteromedian indention of anal segment. Cerci small, narrowing towards the apex and somewhat flattened laterally. Vomer with a fairly long, slender and just weakly arched black terminal hook. Poculum fairly large, bulgy with the posterior margin broadly rounded, labiate and almost reaching to tip of anal segment (Fig. 15F).

Legs. – Fairly slender but the femora slightly inflated, basal flexure of profemora weak. All femora only with a few minute dentations dorsally, the meso- and metafemora with a few small, widely spaced

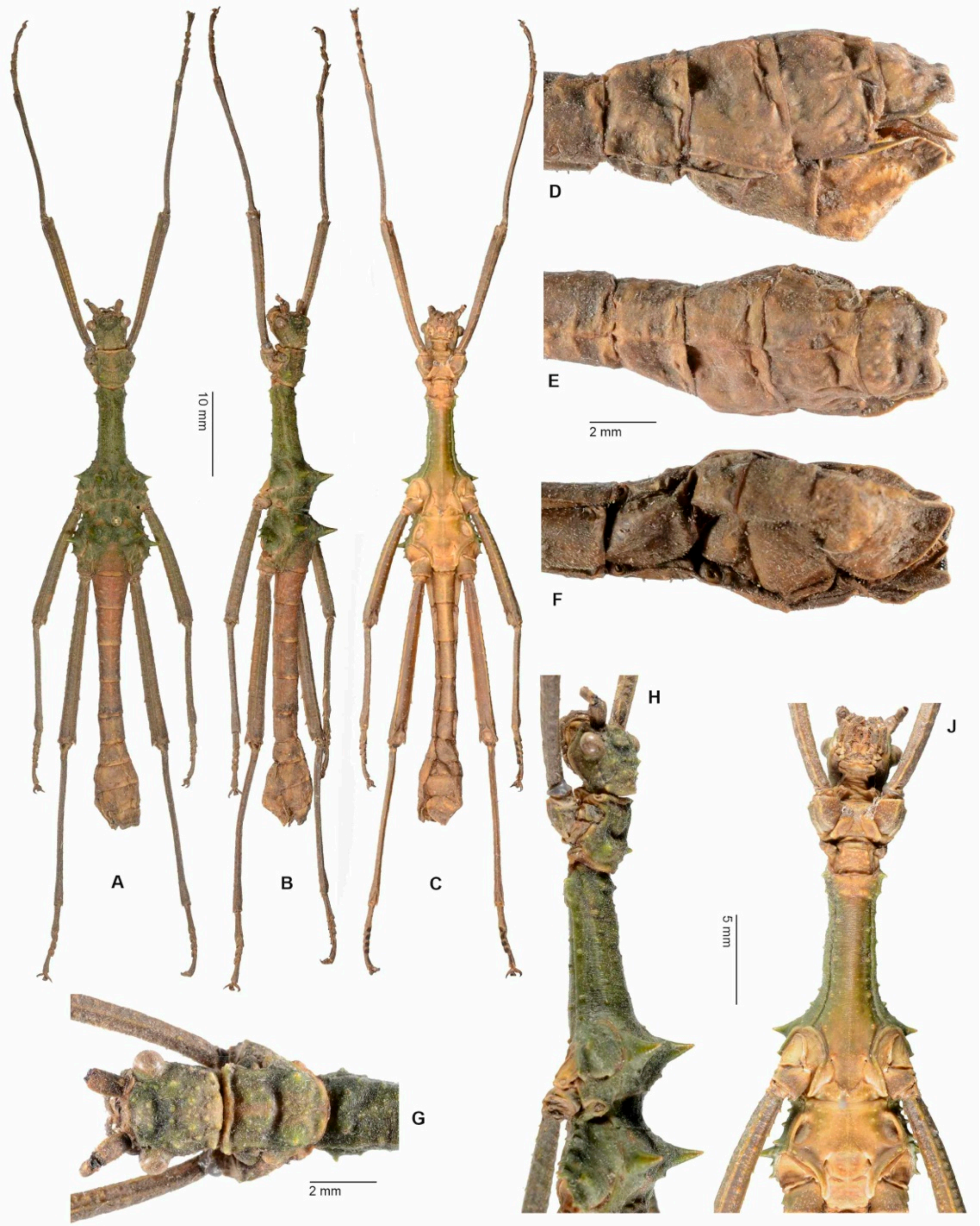

Fig. **15**. *Brasidas malaki* **n**. **sp**. ♂ holotype [RBINS].

– **A**. Habitus, dorsal view. – **B**. Habitus, dorsolateral view. – **C**. Habitus, ventral view. – **D**. Terminalia in lateral view. – **E**. Terminalia in dorsal view. – **F**. Terminalia in ventral view. – **G**. Dorsal view of head and pronotum. – **H**. Lateral view of head and thorax. – **J**. Ventral view of head and thorax.

teeth. Profemora with three moderately distinct spiniform teeth in apical half of two ventral carinae; dorsal carinae with a few small dentations; ventral teeth more pronounced in metafemora with the two apical teeth rather spiniform in shape. Medioventral carina of meso- and metafemora low and set with 8-10 small spiniform tubercles. Tibiae unarmed except for a few minute dentations in apical portion of two outer ventral carinae. Probasitarsus slender and about equal in length to proceeding three joints taken together, meso- and metabasitarsus somewhat shorter.

Measurements [mm]. – Body 70.0, pronotum 4.5, mesonotum 14.9, metanotum 7.1, median segment 2.5, profemora 17.4, mesofemora 16.1, metafemora 21.6, protibiae 18.0, mesotibiae 14.2, metatibiae 21.2.

Remarks. – Females and eggs unknown.

Distribution. – Samar, endemic.

Brasidas manobo n. sp.

(Fig. 16-17 & 70L-M)

ZooBank: https://zoobank.org/ED65126E-F38C-41C0-B67C-3D873CAB1AF7

HT, ♀: Coll. I.R.Sc.N.B., Philippines, Mindanao, Bukidnon Catabglasan, vii.2014, local collector, Gift B. Kneubühler [RBINS].

PT, ♂: Coll. I.R.Sc.N.B., Philippines, Mindanao, Bukidnon Catabglasan, vii.2014, local collector, Gift B. Kneubühler [RBINS].

PT, ♂: Coll. I.R.Sc.N.B., Philippines, Mindanao, Esperanza, Agusan del Norte, vi.2014, Purchased from I. Lumawig, Gift from B. Kneubühler, I.G.: 32.613 [RBINS].

Differentiation. – Females of this distinctive new species are the largest known representatives of the genus and are recognizable by the strongly developed body armature, notably the abdominal terga, which is much stronger than in all other congenerics (Fig. 16B). Morphologically these ♀ come closest to *B. samarensis* Rehn & Rehn, 1939 from the island of Samar but in addition to the larger size and more distinct overall body armature differ by the less numerous but stronger mesosternals, presence of a strong pair of post-median mesonotal spines (Fig. 16G), more obtuse posterolateral angles of the posterior margin of the anal segment (Fig. 16E) and distinctly down-curved apex of the subgenital plate (Fig. 16D). Also ♂ most closely resemble those of *B. samarensis*, with which they share the distinctive green medio-longitudinal streak along the thoracic terga, although it continuous on the abdomen in this new species (Fig. 17A-B). Moreover, ♂ of *manobo* **n. sp.** are notably larger, have the pair of post-medial spines of the pronotum much larger (Fig. 17G), all other spines of the head and thorax comparatively more pronounced, the anal segment different and the vomer with a shorter terminal hook (Fig. 17F). Both sexes can also be separated from *samarensis* by the shape of the metasternal pseudo-foramina (Fig. 70L-M), which are deep, broadly oval (♂) to almost round (♀) cingulate holes (elongate-oval and semi-cingulate in *samarensis*).

Etymology. – This large new species is named after the Manobos, a diverse ethnic group of indigenous people that inhabit wide parts of Mindanao.

Description

♀ (Fig. 16)

Form and colouration. – Size very large (body length 121.5 mm), form typical for the genus but with all elements of body armature strongly developed if compared to congenerics; body surface otherwise moderately granular to tubercular. Colouration of the unique ♀ buff to ochre with a few darker brown speckles and some olive portions in particular on the head and thoracic terga; the abdomen somewhat darker and the ventral body surface rather plain drab. All spines olive at the base with the apical half pale orange, the cephalic spines mostly dark green with only the tip orange. Legs drab with an olive wash and some faint darker mottling. The antennae pale buff with faint greyish brown annuli.

Head. – Longer than wide, subglobose with vertex gently rounded; supra-antennals and the 3-4 gulars small, the supra-orbitals strong, conical spines and the largest of all cephalic spines; the second pair of supra-orbitals more closely spaced and notably smaller but although similar in shape, somewhat more pronounced than the rather equally sized pair of median and lateral coronals; only one small pair of anterior and posterior occipital medials present (Fig. 16G). Eyes projecting subhemispherically and the diameter of eye contained a little more than 2x in length of gena. Tip of antennae missing in the unique ♀, consisting of over 22 joints and at least reaching to abdominal segment III; scapus compressed dorsoventrally and subrectangular in outline, pedicellus round in cross-section and notably shorter than scapus, III considerably longer than pedicellus, IV very short and the following joints gradually increasing in the length with the median antennomeres in particular strongly elongate.

Thorax. – Pronotum of similar dimensions as head and with a distinct pre-median narrowing; notably longer than wide with anterior margin expanded laterally. Armed with a prominent pair of fairly acute medial spines just behind the rather shallow and widely V-shaped transverse median sulcus; anterior margin with weakly developed anterior mesal and somewhat more pronounced, small but spiniform antero-laterals; the pair of inter-posteriors minute (Fig. 16G). Mesothorax notably widening towards the posterior and trapezoidal in outline, moderately elongate and about 2.5x longer than prothorax; the mesonotum with lateral margins weakly expanded posteriorly and slightly narrowing anteriorly, about 2x wider than long. Mesonotum with a distinct pair of anterior spines, a very strong and widely spaced pair of pre-median and equally sized but more narrowly spaced pair of post-median spines (Fig. 16G); the lateral margins only armed with a very long and strong medio-lateral mesonotal spine, that is similar in size to the pre- and post-medial mesonotals. The posterior mesonotals very strong, comical and the largest of all mesonotal spines; around the base with three much smaller spines (Fig. 16G). Metanotum weakly trapezoidal in shape and a little wider than long; the posterior metanotals basically similar to posterior mesonotals but metanotum otherwise only with a pair of short median spines. Mesopleurae with a rather conical and short antero-lateral and four similarly but somewhat unequally sized laterals as well as a notably enlarged medio-lateral spine; meso-pleural large, spinose and with a few small tubercles at the base. Metapleurae roundly deflexed and armed with five laterals that gradually increase in size as well as two comparatively smaller supra-coxals; the metapleural spine prominent and slightly larger than mesopleural. Mesosternum smooth except for a row of six rather short and conical but distinct mesosternals. Metasternum only with two small and conical metasternals; the pseudo-foramina small, covering about half of the lateral margin of metasternum between anterior angle and coxa, fairly deep, cingulate and almost round in shape (Fig. 70L).

Abdomen. – Median segment almost 2x wider than long and trapezoidal in outline; armed with a moderately sized spinose pair of medials and fairly small first and second paired posteriors along posterior margin. Segments II-V roughly uniform in length but slightly widening with IV 2.4x wider than long, V-VII gradually decreasing in width but V-VI somewhat longer than preceding and terga V-VI with an angular posterolateral deflexion. Terga II-VIII all with a distinct medio-longitudinal carina, which more obtuse on IX. Terga II-VII armed with a strong pair latero-anterior spines, a somewhat smaller pair of medials and a full posterior series of five spines, of which the median is very small and the lateral pair the largest; all these spines elongated and acutely pointed but comparatively less developed on VII (Fig. 16D). Tergum VIII only with a moderately sized pair of latero-anterior spines and the medio-longitudinal keel posteriorly terminating in a short, spiniform projection; posterolateral angles protruded into a narrowly triangular process. Sterna smooth except for a shallow lateral bulge that is protruded into a tubercle anteriorly and posteriorly; praeopercular organ on sternum VII formed by a narrow oval median notch of posterior margin that has the outer margin somewhat inflated (Fig. 16F). Tergum IX with lateral margins deflexed and angular posteriorly (Fig. 16E-F) and with a prominent spiniform posteromedian protrusion (Fig. 16D). Anal segment longer than wide, weakly tectate longitudinally with the lateral margins angular in basal half and with the posterior margin obtusely bi-dentate with a distinct V-shaped median emargination; a pair of obtuse tubercles close to anterior margin. Epiproct about 1.3x longer than anal segment, weakly tectate and slightly gradually narrowing towards a narrow, obtusely angular tip (Fig. 16E). Subgenital plate elongate, lanceolate, distinctly keeled in the apical half with apex narrowly rounded, slightly surpassing epiproct and notably down-curved (Fig. 16D).

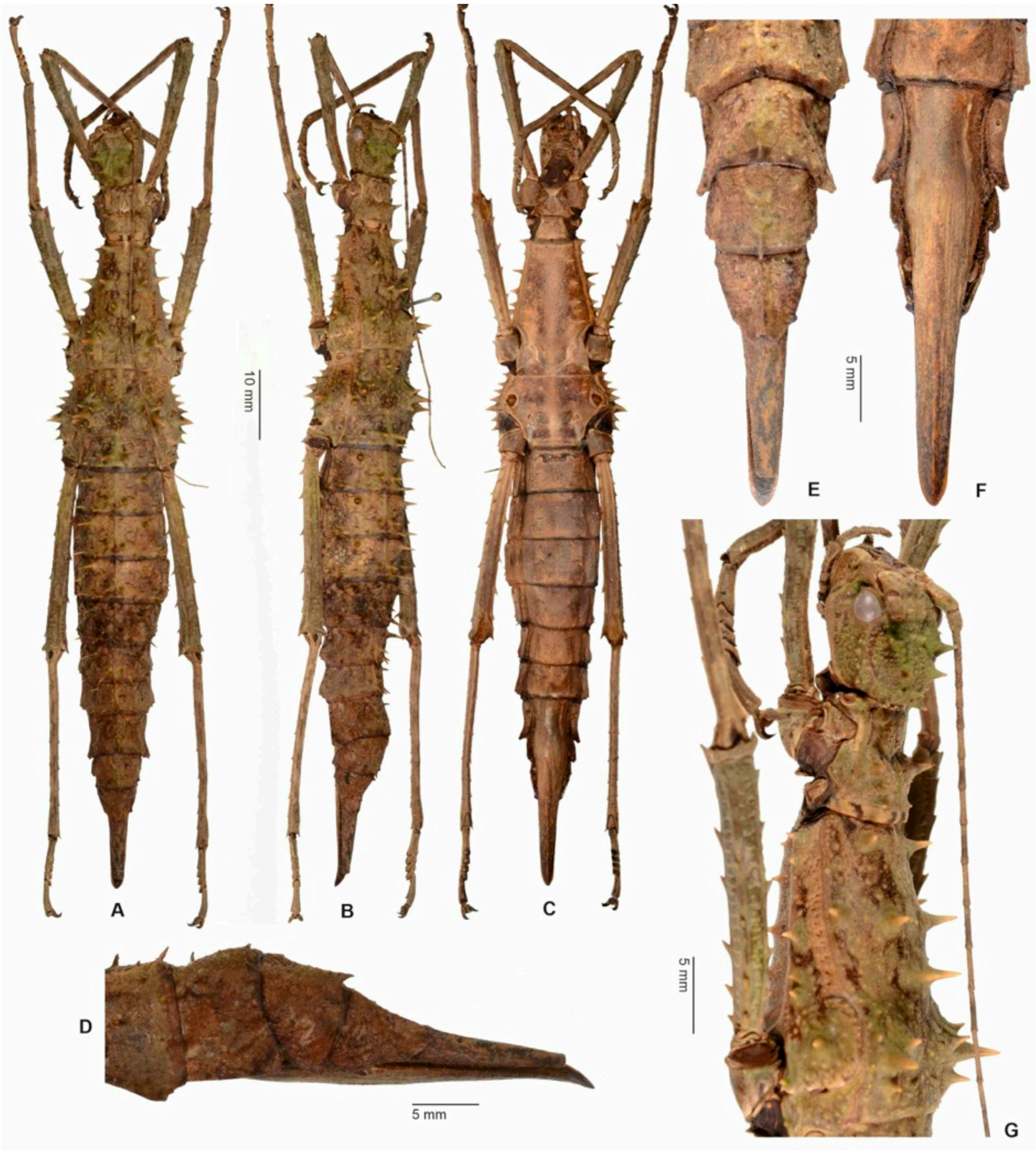

Fig. 16. *Brasidas manobo* **n. sp.** ♀ holotype [RBINS].

– **A**. Habitus, dorsal view. – **B**. Habitus, dorsolateral view. – **C**. Habitus, ventral view. – **D**. Terminalia in lateral view. – **E**. Terminalia in dorsal view. – **F**. Terminalia in ventral view. – **G**. Dorsolateral view of head, pro- and mesothorax.

Legs. – Relatively slender, basal flexure of profemora distinct. Profemora with three moderately distinct spiniform teeth in apical half of two ventral carinae; dorsal carinae with a 6-7 rather small dentations. Meso- and metafemora basically with 6-7 teeth on all four carinae, these more spiniform and developed on ventral carinae of metafemora. Medioventral carina of meso- and metafemora shallow and only marked by minute granules. Meso- and metatibiae smooth dorsally and with some rather small dentations ventrally. Basitarsus almost as long as three proceeding tarsomeres taken together.

Measurements [mm]. – Body 121.5, pronotum 7.3, mesonotum 18.8, metanotum 10.0, median segment 4.8, profemora 22.3, mesofemora 149.7, metafemora 27.3, protibiae 22.5, mesotibiae 20.5, metatibiae 31.3, antennae > 60.0.

♂ (Fig. 17)

Form and colouration. – Size large (body length 71.0-73.0 mm), form rather typical with the head and body armature well developed; body surface otherwise moderately granular and verrucose. Colouration fairly plain drab or with a yellowish green to olive wash and with a broad dark green medio-longitudinal stripe running along entire dorsal body surface including the vertex. Largest spines of the head and thorax green and tipped with dull orange. Ventral surface of thorax buff and that of abdomen rather drab. Legs drab with the meso- and metafemora gradually becoming lighter and ochraceous in colour towards the base; teeth brown. Antennae greyish mid brown and gradually becoming dark orange towards the apex.

Head. – Shape and armature essentially as in ♀ but vertex somewhat more rounded and all the spines somewhat stronger; only one posterior gular tubercle present (Fig. 17G). Eyes much larger and projecting more than hemispherical. Antennae like in ♀, with 26 joints and reaching to abdominal segment VIII; the median joints extremely elongated.

Thorax. – Prothorax generally as in ♀ but with a prominent semi-circular pre-median lateral excavation; armature alike but spines comparatively stronger and more conical (Fig. 17G). Mesothorax fairly elongate for the genus being 2.8x longer than the prothorax; anterior two-thirds slender and roughly uniform in diameter, posterior portion strongly widened and tumescent. Mesonotum unarmed except for a ± enlarged but very low and

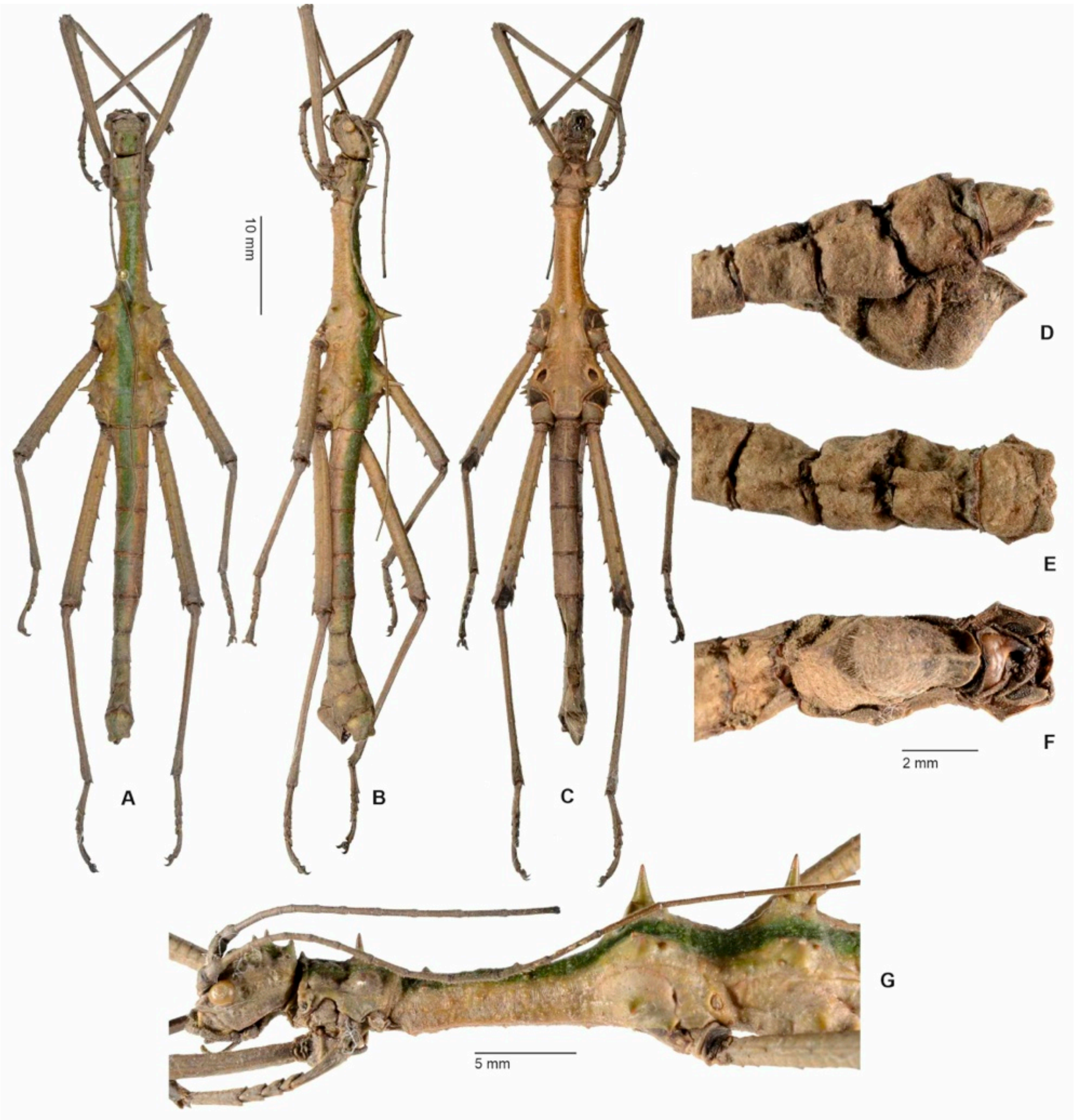

Fig. 17. *Brasidas manobo* **n. sp.** ♂ paratype [RBINS].

– **A**. Habitus, dorsal view. – **B**. Habitus, dorsolateral view. – **C**. Habitus, ventral view. – **D**. Terminalia in lateral view. – **E**. Terminalia in dorsal view. **F**. Terminalia in ventral view. – **G**. Dorsolateral view of head, pro- and mesothorax.

nodose pair of anterior and median tubercles, occasionally with a smaller and greatly spaced pair of pre-median nodes; posterior mesonotals prominent, strong, conical and spinose with three spiniform tubercles around the base (Fig. 17G). Metanotum trapezoidal in outline, the posterior metanotals generally like those of the mesonotum but even somewhat larger and slenderer. Pleurae with armature essentially like in ♀ but much less pronounced; the mesopleurae only with the antero-lateral represented by an obtusely conical tubercle; the metapleural noticeably larger than the mesopleural. Meso- and metasternum minutely granular and the metasternum with a low and rather indistinct medio-longitudinal carina; mesosternum only with six indistinct, low and obtuse paired mesosternals and metasternum merely with two tuberculiform metasternals. Metasternal pseudo-foramina represented by deep cingulate holes that are basically oval in shape with the posterior margin angular and notably larger than in ♀ (Fig. 70M).

Abdomen. – Median segment distinctly trapezoidal in outline with anterior margin strongly narrowed and rounded; unarmed except for a low and small pair of node-like medials. Segment II-IV roughly uniform in length, II trapezoidal and narrowing to posterior, III-VI rather uniform in width, V-VII slightly decreasing in length and as wide as III; all notably longer than wide but VII shorter than all preceding segments, scarcely longer than wide and slightly widening towards posterior. Terga II-VII unarmed except for a blunt and short, tuberculiform pair of latero-anteriors and a granular pair of medials; the posterior series merely indicated by shallow swellings. Sterna II-VI smooth but with an indistinct medio-longitudinal carina, which is notably more pronounced on VII. Terga VIII and IX transverse and weakly tectate medio-longitudinally with lateral margins of IX deflexed; VIII trapezoidal in outline X. Anal segment considerably shorter than IX, deflexed in basal half, narrowed posteriorly and the posterior margin bi-lobed with a deep and broadly triangular median emargination; a transverse furrow confining the posterolateral angles (Fig. 17E), which ventrally bear a few small denticles. Epiproct fairly large, shield-shaped and scarcely projecting into median excavation of posterior margin of anal segment. Vomer with base broad, shape asymmetrically heart-shaped with a fairly long and strong terminal hook that is distinctly arched towards the right

(Fig. 17F). Cerci strongly compressed laterally, small. Poculum large, bulgy, roundly cup-shaped (Fig. 17D) and with a high medio-longitudinal keel in the vertical posterior portion; posterior margin rounded, somewhat labiate and with a minute median indention (Fig. 17F).

Legs. – Basically, with armature like in ♀, but all ventral teeth more acute and rather spiniform and the dorsal teeth wanting; hind legs projecting strongly over apex of abdomen. The two apical spines on the two outer ventral carinae of the metafemora strong. Basitarsus slightly longer and slenderer, the pro- and metabasitarsus notably longer than following three joints taken together.

Measurements [mm]. – Body 71.0-73.0, pronotum 4.7-4.8, mesonotum 15.1-15.3, metanotum 6.3-6.4, median segment 3.8-3.9, profemora 17.2-18.1, mesofemora 15.3-15.5, metafemora 20.4-21.0, protibiae 17.3-18.0, mesotibiae 15.0-15.4, metatibiae 22.6-22.8, antennae 62.0.

Remarks. – Eggs unknown.

Distribution. – Mindanao, endemic.

Brasidas rehni **n. sp.**

(Fig. 18 & 70O-P)

ZooBank: https://zoobank.org/F92C8F80-A476-4495-A0D4-1CC954EB06F9

Euobrimus cavernosus, Rehn & Rehn, 1939: 449, pl. 31: 8 (♂), 36: 38 (♀), 38: 44 (♀ metasternum).

HT, ♀: Siargao Philippin; *Euobrimus cavernosus* (Stal) 1938, Det. J.W.H. Rehn, Hebard Cln. 19 [ANSP].

PT, ♀: Siargao Philippin; *Euobrimus cavernosus* (Stal) 1938, Det. J.W.H. Rehn, Hebard Cln. 19 [ANSP].

PT, ♂: Siargao Philippin; *Euobrimus cavernosus* (Stal) 1938, Det. J.W.H. Rehn, Hebard Cln. 19 [ANSP].

Differentiation. – This large new species is morphologically closest and very similar in general shape, appearance and spination to *B. viscayanus* Rehn & Rehn, 1939 from Mindanao, but differs by having all elements of the head and body armature notably less developed as well as the much smaller and rather triangular (♀, Fig. 70O) or elliptical (♂, Fig. 70P) metasternal pseudo-foramina. Females may also be separated by having the anterior pair of spines on the abdominal terga II-V smaller or at best equal in size to the remaining tergal spines (larger than all others in *viscayanus*), the posterior meso- and metanotals cristate (simple spines in *viscayanus*), the projections of the praeopercular organ much smaller and rather spinose and the posterior margin of the anal segment and apex of the epiproct less indented. The smooth surfaced ♂ of this new species can readily be distinguished from those of *viscayanus* by lacking the distinct pair of anterior mesonotals (Fig. 18E), having the posterior meso- and metanotals large, simple and spinose and the meso- and metapleurals strong and simply but short and only tuberculate (distinct spines with tuberculated base in *viscayanus*). The green medio-longitudinal streak on the meso- and metanotum and basal abdominal terga resembles *B. manobo* **n. sp.** and *B. samarensis* Rehn & Rehn, 1939, but the strongly reduced armature of the head and thorax and lack of anteriors on the mesonotum readily separate ♂ of this new species.

Etymology. – Named in honour of James Abram Garfield Rehn (1881-1965), an American entomologist and specialist on the Orthoptera, who worked at the Academy of Natural Sciences of Philadelphia, U.S.A., and must be regarded one of the most outstanding workers on the taxonomy of Phasmatodea of his time. He is well-known for his very accurate work and descriptions and was the first to present an in-depth study of the Philippine Obriminae stick insects, providing us with an elaborate and well usable acanthotaxy for this clade, which is also applied for species descriptions herein.

Description

♀ (Fig. 18A-C)

Form and colouration. – Size large (body length 103.0-112.3 mm), form rather slender with the elements of armature quite poorly developed if compared to congenerics; body surface otherwise moderately granular and the meso- and metanotum and basal abdominal terga with a fine medio-longitudinal carina. Colouration of the holotype fairly plain fuscous with some dark ochre on the head, pronotum and posterior portions of the meso- and metathorax; the largest spines of the thorax ochre and the granules tipped with black. Limbs with a slight greyish wash. The paratype slightly lighter in colour with some grey and a slight greenish hue on thorax.

Head. – Scarcely longer than wide, subrectangular with vertex fairly rounded, convex and all the armature rather poorly developed; supra-antennals and supra-orbitals small and tuberculate, supra-orbital series represented by two low conical tubercles and two pairs of occipital medials slightly enlarged; the four coronals more pronounced, strong but low and conical; occiput otherwise unevenly tubercular. Genae only with 2-3 gular Eyes moderately projecting and their diameter corresponding to about half the length of gena. Antennae broken in both available examples (but number of joints believed to be 25 as in ♂); scapus compressed dorsoventrally and roundly rectangular in outline, pedicellus globose, III notably longer than pedicellus and gradually constricting towards apex, III very short and the following gradually increasing in the length.

Thorax. – Pronotum slightly longer and as wide as head, basically rectangular in outline but with a distinct pre-median concave excavation laterally; notably longer than wide. Surface unevenly granular and only armed with a moderately developed tubercular pair of post-medials just behind the gently arched and moderately impressed transverse median sulcus; otherwise only the antero-laterals somewhat more pronounced but small conical. Mesothorax slightly gradually widening towards the posterior, elongate and about 2.6x longer than prothorax. Mesonotum parallel-sided and 2.5x longer than wide; anterior mesonotals, medials and post-medials all spinose but small and the lateral margins with a moderately enlarged and conical medio-lateral; posterior mesonotals small but strong, spinose and cristate. Posterior metanotoals like posterior mesonotals but metanotum without any notably enlarged tubercles. Mesopleurae with a rather prominent spinose antero-lateral, a slightly smaller medio-lateral and two posterior-laterals; meso-pleural rather small and tuberculate. Metapleurae moderately expanded and rounded in posterior half and armed with about eight just slightly subequally sized spines, the metapleural small, tuberculate. Mesosternum smooth except for about six fairly distinct and spinose mesosternals close to lateral margins. Metasternum only with three small metasternals; the pseudo-foramina small, transversely triangular, deep and open holes (Fig. 70O).

Abdomen. – Median segment distinctly transverse with anterior widely angular, only set with a small pair of tubercular medials. Segments II-VII roughly uniform in width and length and about 1.6x wider than long. Terga II-V with fairly distinct, spinose anteriors, medials, second paired posteriors and medio-laterals; VI-IX unarmed and only with a medio-longitudinal carina, which becomes increasingly pronounced towards apex of abdomen and is protruded to form a low, dentiform posterior process on VIII and IX (Fig. 18J). Sterna smooth except for a small medio-lateral pair of spiniform tubercles on II and III; praeopercular organ on sternum VII formed by a shallow median notch of posterior margin and pair of obtusely conical swellings. Anal segment longer than wide, obtusely and weakly tectate longitudinally, the lateral margins with a concave median excavation and the posterior margin rather weakly indented medially. Epiproct about 1.3x longer than anal segment, weakly tectate and slightly gradually narrowing towards a narrow but obtuse and weakly notched apex (Fig. 18K). Subgenital plate elongate, lanceolate, distinctly keeled in the apical half and slightly surpassing epiproct; the apex triangular and down-curved (Fig. 18J).

Legs. – Relatively slender with all the dentations rather weakly developed, basal flexure of profemora distinct. Profemora with three small spiniform teeth in apical half of two ventral carinae; dorsal carinae with a few small dentations. Meso- and metafemora basically with about six teeth on all four carinae, these more pronounced and gradually increasing in size towards apex on ventral carinae. Medioventral carina of meso- and metafemora notable and with 6-8 small spiniform tubercles, which disappear towards the apical one-third of femur. Meso- and metatibiae with rather minute dentations on ventral

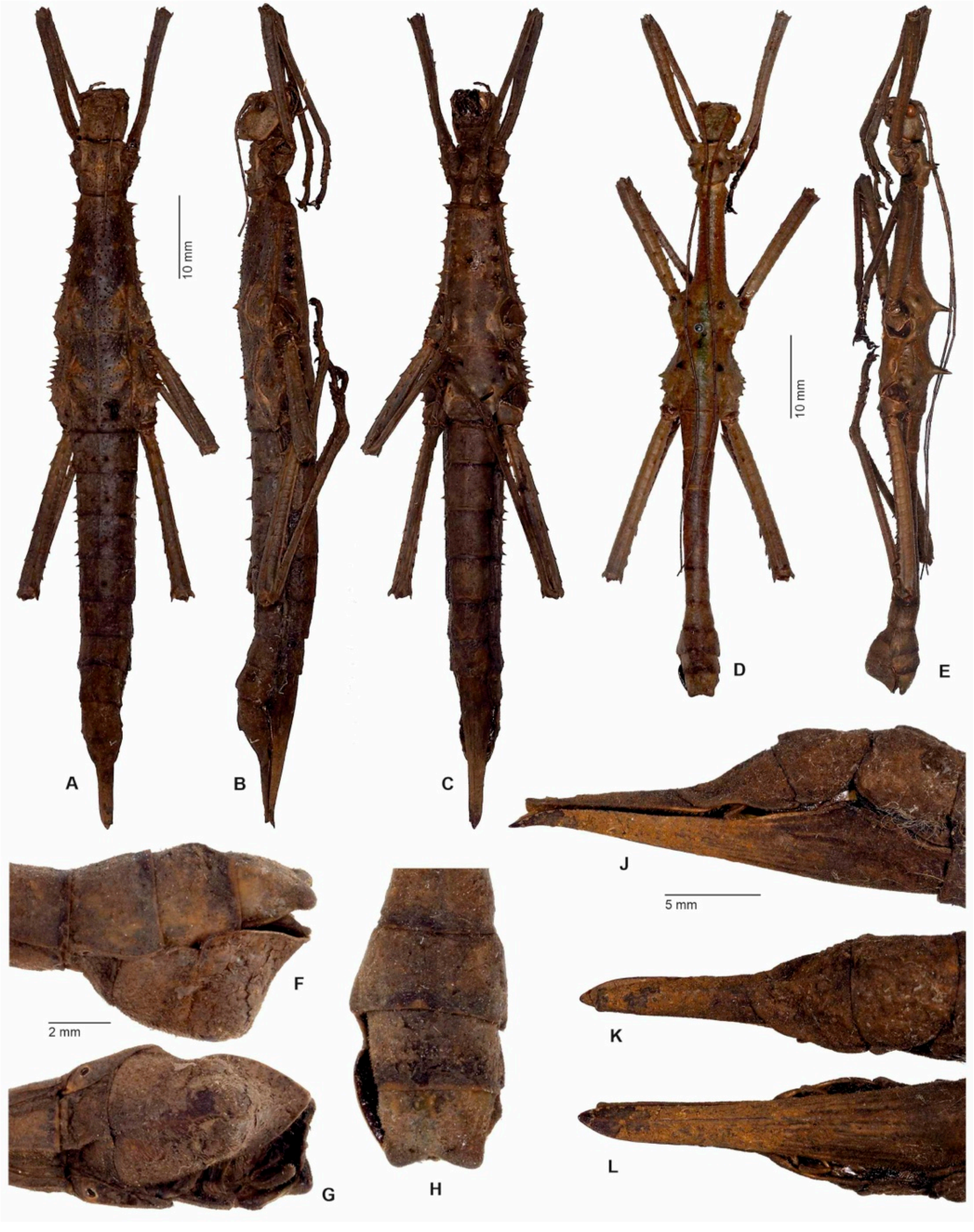

Fig. **18**. *Brasidas rehni* **n**. **sp**. [© Jason Weintraub, ANSP].

– **A**. ♀ holotype habitus, dorsal view. – **B**. ♀ holotype habitus, lateral view. – **C**. ♀ holotype habitus, ventral view. – **D**. ♂ paratype habitus, dorsal view. – **E**. ♂ paratype habitus, lateral view. – **F**. Terminalia of ♂ paratype in lateral view. – **G**. Terminalia of ♂ paratype in ventral view. – **H**. Terminalia of ♂ paratype in dorsal view. – **J**. Terminalia of ♀ holotype in lateral view. – **K**. Terminalia of ♀ holotype in dorsal view. – **L**. Terminalia of ♀ holotype in ventral view.

carinae, smooth dorsally. Probasitarsus almost as long as three proceeding tarsomeres; meso- and metabsitarsus slightly shorter.

Measurements [mm]. – Body 103.0-112.3, pronotum 7.1-7.3, mesonotum 18.9-20.3, metanotum 9.0-9.7, median segment 4.6-4.9, profemora 18.0-20.7, mesofemora 16.2-18.4, metafemora 19.5--25.0, protibiae 20.0-22.3, mesotibiae 17.2-19.0, metatibiae 26.4-28.6, antennae -.

♂ (Fig. 18D-E)

Form and colouration. – Size large (body length 72.8 mm), form rather slender for the genus with the elements of armature poorly developed if compared to congenerics, except for the large but simple and spinose posterior meso- and metanotals; body surface otherwise conspicuously smooth and just weakly granular. Colouration plain buff with the dorsal portions of the meso- and metanotum rather russet; fuscous with faint darker mottling; meso- and metanotum and three basal abdominal terga with a faint dark green medio-longitudinal streak, which is most pronounced on the metanotum; the posterior meso- and metanotals, meso- and metapleurals and pair of prothoracic spines tipped with dark brown. Limbs buff with the spines darker brown.

Head. – Roundly subrectangular and scarcely longer than wide with vertex flattened and just weakly swollen medially; surface minutely and unevently tubercular and only the four coronals and a pair of occipital medials enlarged, but flat and obtusely conical; supra-antennals small, tubercular and supra-orbitals minute. Genae merely with 2-3 gulars that are represented as node-like granules. Eyes fairly large, projecting hemispherically and their diameter corresponding to 1.7x length of gena. Antennae with 25 joints and reaching to anterior of abdominal segment VI; scapus compressed dorsoventrally and oval in outline, pedicellus globose, III notably longer than pedicellus, IV very short and the following gradually increasing in the length with the median antennomeres strongly elongated.

Thorax. – Pronotum about as long but slightly wider than head and with a distinct semi-circular pre-median excavation; shape subquadrate. Just behind the rather shallow and almost straight tranverse median sulcus armed with a prominent pair of fairly acute medial spines; otherwise only the antero-lateral pronotals developed and slightly spiniform. Mesothorax slender and notably widened and inflated in posterior portion, elongate and about 3.6x longer than prothorax. Mesonotum unarmed except for strong, but simple and spinose posterior mesonotals. Metanotum slightly trapezoidal in outline, somewhat inflated posteriorly and the posterior metanotals similar but slightly larger than posterior mesonotals; surface otherwise unarmed. Mesopleurae unarmed except for a low, hump-like antero-lateral and a stout, obtusely spinose mesopleural. Metapleural similar to mesopleural but metapleurae otherwise with about six tubercles, the three laterals of which are small, tubercular and the three supra-coxals conical and rather subspinose. Mesosternum smooth except for some rather small and granular mesosternals. Metasternum with a shallow granulose central swelling and otherwise sparsely granular; the pseudo-foramina of average size, open and oval holes that cover about half of the distance from the anterior margin of the metasternum to the metacoxal (Fig. 70P).

Abdomen. – Median Median segment trapezoidal in shape and unarmed. Segments II-IV slightly increasing and V.VII decreasing in length with IV longest and 1.3x longer than wide; II and VII distinctly trapezoidal and III-VI roughyl uniform in diameter. Terga unarmed. Sterna II-VII with a fine medio-longitudinal carina and only II with a small pair of anterior tubercles; all others smooth. Terga VIII and IX transverse and weakly tectate medio-longitudinally, VIII with an obtuse and shallow hump-like posteromedian protuberance. Anal segment somewhat shorter than IX, deflexed in basal half, narrowed posteriorly and the posterior margin broadly bi-lobed with a deep and broadly triangular median emargination (Fig. 18H); the posterolateral angles ventrally with a few small denticles. Epiproct small, triangular and just slightly projecting beyond posteromedian emargination of anal segment. Vomer basically triangular in outline with a fairly strong terminal hook that is slightly arched towards the right. Cerci small, compressed laterally and gently in-curved. Poculum very large, bulgy, roundly angular (Fig. 18F) and with an obtuse medio-longitudinal keel in the vertical posterior portion; posterior margin triangular and roughly reaching to tip of anal segment (Fig. 18G).

Legs. – Relatively slender, basal flexure of profemora distinct. Profemora with three triangular teeth in apical half of two ventral carinae; dorsal carinae only with a few minute dentations. Meso- and metafemora only with a few small teeth dorsally; the two outer ventral carinae each with about seven teeth that notably increase in size with the two apical ones strong and spinose; medioventral carina of meso- and metafemora notable and with 6-8 granules, that gradually disappear towards the apical one-third. Meso- and metatibiae with numerous small and uneven dentations ventrally, smooth dorsally. Basitarsus about as long as three proceeding tarsomeres taken together.

Measurements [mm]. – Body 72.8, pronotum 4.9, mesonotum 17.0, metanotum 8.5, median segment 3.8, profemora 16.7, mesofemora 15.4, metafemora 20.5, protibiae 17.0, mesotibiae 14.3, metatibiae 20.6, antennae 58.5.

Remarks. – This species was misidentified by Rehn & Rehn (1939: 449) as *Euobrimus cavernosus*. Examination of the specimens in the collection of ANSP has shown them to be a separate as yet undescribed species. It is so far only known from Siargao, a small island off the north-eastern coast of Mindanao. Eggs unknown.

Distribution. – Siargao, endemic.

Brasidas samarensis Rehn & Rehn, 1939

(Fig. 19, 23 A-B, D, F, 70G-H, 72C & 73G-H)

Brasidas samarensis Rehn & Rehn, 1939: 432, pl. 35: 33, 36: 37.

HT, ♂: Island, Samar, Baker; USNM; Type No. 53228, U.S.N.M.; *Brasidas samarensis* R + R Type [USNM];

PT, ♀: Island, Samar, Baker; USNM; Type No. 53228, U.S.N.M.; Allotype *Brasidas samarensis* R + R Paratype [USNM];

PT, ♀: Island, Samar, Baker; *Brasidas samarensis* R + R Paratype [ANSP];

PT, ♂: Island, Samar, Baker; *Brasidas samarensis* R + R Paratype [ANSP];

PT, ♀ (juvenile): Island, Samar, Baker; *Brasidas samarensis* R + R Paratype [ANSP].

- Brock, 2003: 69, pl. 7a-b. (Notes on rearing)
- Zompro, 2004: 216, figs.
- Fritzsche & Schuette, 2004: 23.
- Otte & Brock, 2005: 74.
- Harman, 2013: 14. (Origin of culture stock)
- Hennemann et al., 2016: figs. 23-24, 41, 50-a-b.
- Brock & Büscher, 2022: 521.

Material examined

1 ♀, **1** ♂: Philippinen, Eastern Visayas, N-Samar Id., Prov. Northern Samar, Lope de Vega, local collector, III.2010 [FH, No's 0496-33 & 34];

1 ♂: Philippinen, Eastern Visayas, N-Samar Id., Prov. Northern Samar, Lope de Vega, local collector, IX.2011 [FH, No 0496-35];

10 ♀, **10** ♂: ex Zucht F. Hennemann, urspr.: Philippinen, Samar Id., Bobon, II.-XII.2003[FH No's 0496-1 to 20];

6 ♀, **6** ♂, eggs: ex Zucht F. Hennemann 2004-06, Herkunft: Philippinen, Samar Id., Bobon, PSG No. 235 [FH No's 0496-21 to 32, E];

2 ♀, **1** ♂: Philippinen, Eastern Visayas, N-Samar Id., Prov. Northern Samar, Lope de Vega, local collector, VI.2013 [FH, No 0496-36 to 38];

1 ♀: Philippines, Samar, Lope de Vega, I.2012 [RBINS];

1 ♀: Philippines, Samar, Lope de Vega, III.2012 [RBINS];

1 ♀, **1** ♂: Philippines, Samar, Lope de Vega, IV.2013 [RBINS];

3 ♀, **1** ♂: Ex culture Bresseel 2007; Origin: Philippines, Samar, Bobon, Sea level, Leg. A. Maluche [RBINS].

Differentiation. – In general appearance and morphologically this species comes closest to *B. cavernosus* from Luzon and Rapu Rapu, with which it shares the interiorly open and rather slender, oval metasternal pseudo-foramina of both sexes (Fig. 70G-H). Females may merely be distinguished by the slightly stockier general shape and the on average smaller size, as well as the somewhat smaller and rather tuberculiform pair of posterior pronotals, more numerous and pointed mesosternals (Fig. 19E) and just shallow median notch of the posterior margin of abdominal sternum VII (Fig. 19J). Moreover, ♀ of *samarensis* rarely have a cream-coloured or whitish medio-longitudinal streak on the thoracic terga, that is very frequently seen in *cavernosus*. Males lack the typical reddish or rusty brown lateral surfaces of the

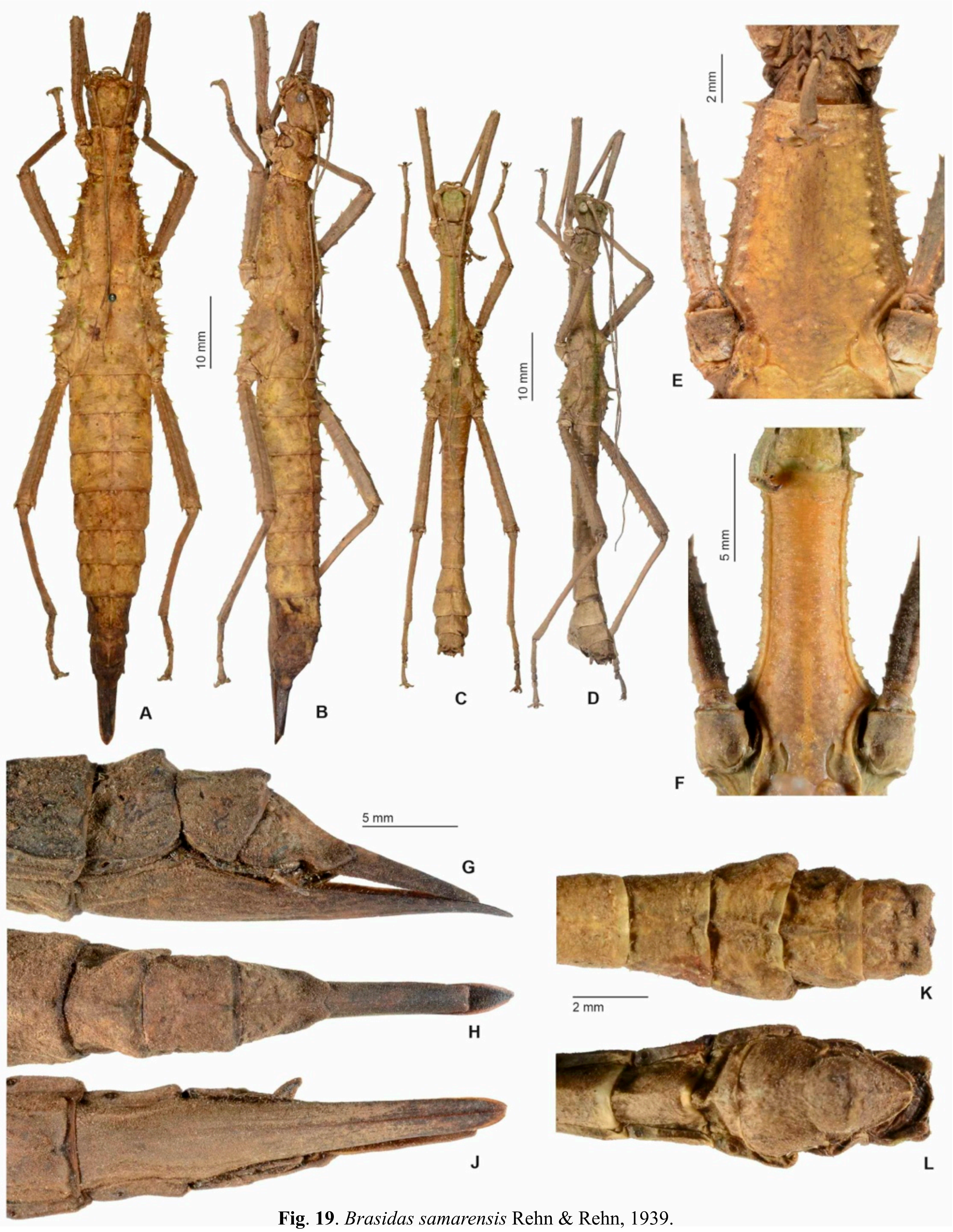

Fig. **19**. *Brasidas samarensis* Rehn & Rehn, 1939.

– **A**. ♀ dorsal view [FH 0496-6]. – **B**. ♀ dorsolateral view [FH 0496-6]. – **C**. ♂ dorsal view [FH 0496-29]. – **D**. ♂ dorsolateral view [FH 0496-29]. – **E**. Mesosternum of ♀. – **F**. Mesosternum of ♂. – **G**. Terminalia of ♀ in lateral view (Samar, Lope de Vega) [RBINS]. – **H**. Terminalia of ♀ in dorsal view (Samar, Lope de Vega) [RBINS]. – **J**. Terminalia of ♀ in ventral view (Samar, Lope de Vega) [RBINS]. – **K**. Terminalia of ♂ in dorsal view. – **L**. Terminalia of ♂ in ventral view.

mesonotum and dark blackish purple ventral surfaces of the femora seen in *cavernosus*, and instead often have a ± defined green medio-longitudinal streak along the thoracic terga. In addition to the averagely smaller size, ♂ of *samarensis* may also be separated from those of *cavernosus* by the broader posterior margin of the anal segment (Fig. 19K), larger and medially protruded epiproct, more distinctly arched terminal hook of the vomer (Fig. 72C) and broader posteromedian indention of the poculum. The eggs are also very similar to those of *samarensis* and may only be distinguished by the somewhat narrower anterior end of the capsule and relatively smaller posterolateral extensions of the micropylar plate (Fig. 73G-H).

Variability. – Despite chromatic variability, the ♀ at hand show only some variability in the size of the abdominal spines. In all other aspects there is no notable variation. The colour is basically dark green with or olive and to a variable degree flecked with ochre and brown. Rarely specimens are rather brown than green in overall colour and one of the ♀ from Lope de Vega has an ochre medio-longitudinal streak on the thoracic segments (less distinct on basal abdominal terga). All spines of the head and body are mid to dark green. Males show even less variability in the spination and colour. They range from ochre to dark green in colour and there often is a washed dark green medio-longitudinal stripe along the meso- and metanotum, which is more commonly seen in green specimens. Brown examples usually have the meso- and metathorax with a slight orangey hue. Body lengths: ♀ 86.0-102.0 mm, ♂ 55.5-67.0 mm.

Remarks. – Culture stock originating from Bobon, N-Samar and collected by Andy Maluche (Philippines) has been reared in Europe for several years but the stock seems to have vanished. It was included on the Phasmid Study Group culture-list as culture No. 235. Breeding was pretty easy in humid conditions and accepted alternative food-plants included bramble and raspberry (*Rubus* spp., Rosaceae), roses (*Rosa* spp., Rosaceae), hazel (*Corylus avellana*, Betulaceae), oaks (*Quercus* spp., Fagaceae), salal (*Gaultheria shallon*, Ericaceae) and hawthorn (*Crategus* spp., Rosaceae). The egg is illustrated in figures 73G-H.

Distribution. – Samar, endemic. “Samar” [ANSP, USNM]; Province Northern Samar (Lope de Vega [FH, RBINS]; Bobon [FH, RBINS]).

Brasidas viscayanus Rehn & Rehn, 1939

(Fig. 20-21, 23C & 70J-K)

Brasidas viscayanus Rehn & Rehn, 1939: 438, pl. 31: 12, 34: 27, 38: 45.

HT, ♀: Butuan, Mindanao, Baker; *Brasidas viscayanus* Rehn + Rehn, Type, Hebard Cln; Data Base Serial No. assigned as Type No. September 2008, Type #9119 [ANSP];

PT, ♂: Butuan, Mindanao, Baker; USNM; Allotype No. 53230 U.S.N.M., Alloptype *Brasidas viscayanus* Rehn + Rehn, Paratype [USNM].

- Otte, 1978: 79. (Type data)
- Zompro, 2004: 216.
- Otte & Brock, 2005: 74.
- Brock & Büscher, 2022: 521.

Material examined

1 ♀: Philippinen, Mindanao Island, Prov. Agusan del Sur, San Agustin, local collector III.2010 [FH, No. 1432-1];

1 ♀: Philippinen, Mindanao Island, Prov. Agusan del Sur, San Agustin, local collector V.2013 [FH, No. 1432-2];

1 ♀: Philippinen, Mindanao Island, Prov. Agusan del Sur, Esperanza, local collector VIII.2011 [FH, No. 1432-3];

1 ♀, **1** ♂: Philippinen, Mindanao Island, Prov. Agusan del Sur, Esperanza, local collector VII.2012 [FH, No. 1432-4 & 5];

6 ♀, **8** ♂, **1** ♂ (penultimate instar), 1 ♀ (immature): Philippinen, Prov. Agusan del Sur, Sibagat, local collector III-XII.2013 [FH No’s 1432-6 to 21];

1 ♂: Philippinen, Mindanao Island, Prov. Agusan del Sur, San Luis, local collector VIII.2011 [FH, No. 1432-22].

Differentiation. – Close and very similar in general appearance to the common Mindanaoan species *B. lacerta*, but generally larger with the body length of ♀ usually > 95.0 mm and that of ♂ > 70.0 mm and both sexes are somewhat slenderer in general shape and have the metasternal pseudo-foramina comparatively smaller and more rounded in shape (Fig. 70E-F). Females may also be distinguished from those of *lacerta* by having the mesonotum roughly parallel-sided and rectangular in shape with the mesothorax generally more uniform in width, more spinose posterior meso- and metanotals with only a few minute tubercles around the base, the mesosternals more numerous, notably larger and more acute (Fig. 20F), the triangular posteromedian indention of the anal segment acute-angled (*ca.* 90°, Fig. 20C), the posterior margin of abdominal sternum VII less inflated and medially indented and the pit of the praeopercular organ smaller (Fig. 20D). Males can also be separated from those of *lacerta* by the relatively more elongate abdominal terga (tergum IV 1.75x *vs* 1.65x longer than wide, Fig. 21A), somewhat more pronounced and stronger meso- and metapleural spine, more pronounced medio-longitudinal keel of the meso- and metasternum (Fig. 70K), slightly more inflated and bi-lobed posterior margin of the anal segment (Fig. 21D), relatively smaller epiproct and more numerous and smaller ventral dentations of the meso- and metafemora.

Also similar to *B. bakeri* from Samar and Luzon but both sexes are notably stockier in shape and the head is globose with the vertex roundly convex and armed with a distinct pair of occipitals medial spines (Fig. 20G-H, 21F), whereas the vertex is flattened in *bakeri* and lacks distinct occipital medials. Females also differ from those of *bakeri* by lacking the medio-longitudinal bulge of the meso- and metanotum and three dorsal abdominal terga seen in *bakeri*, notably widening mesonotum (almost parallel-sided in *bakeri*), much more pronounced mesosternals (Fig. 20F), rather rounded metasternal pseudo-foramina (Fig. 70J, narrowly and elliptical in *bakeri*), and longer ovipositor, in which the visible part of the epiproct is noticeably longer than the anal segment (Fig. 20C-E). Males may also be distinguished from those of *bakeri* by the shorter mesothorax (3.2x vs. 3.6x longer than pronotum in *bakeri*), broader and oval metasternal pseudo-foramina (Fig. 70K, narrow and slit-shaped in *bakeri*), smaller or wanting anterior pair of spines on abdominal terga II-III and bilobed posterior margin of the anal segment (Fig. 21D, almost straight in *bakeri*).

Variability. – The specimens at hand show just slight variability in size, colouration and armature of the thorax and basal abdominal terga. In ♀ the variability is restricted to the size of the individual spines. One ♂ from Sibagat is much more spinose than all other known specimens. It has an additional strong pair each of median mesonotals and medio-lateral mesonotals, as well as a closely spaced pair of slender and acutely pointed medial spines on the median segment (abdominal tergum I) and a pair of distinct latero-anteriors on abdominal terga II and III. All these spines are not present in any of the other specimens in the authors collection, but in all other aspects this ♂ well matches with these. Only the ♂ paratype in the collection of USNM also has the paired antero-laterals on abdominal terga II and III but lacks the other spines seen in the aforementioned Sibagat specimen. Body lengths: ♀ 97.0-103.0 mm, ♂ 72.3-77.5 mm.

Remarks. – The specimens in the authors collection provide us with four new records of *B. viscayanus* from throughout the Agusan del Sur Province in northeast Mindanao. Eggs unknown.

Distribution. – Endemic. Northeast Mindanao: Province Agusan del Norte (Butuan [ANSP – type locality]); Province Agusan del Sur (San Agustin [FH]; San Luis [FH]; Esperanza [FH]; Sibagat [FH]).

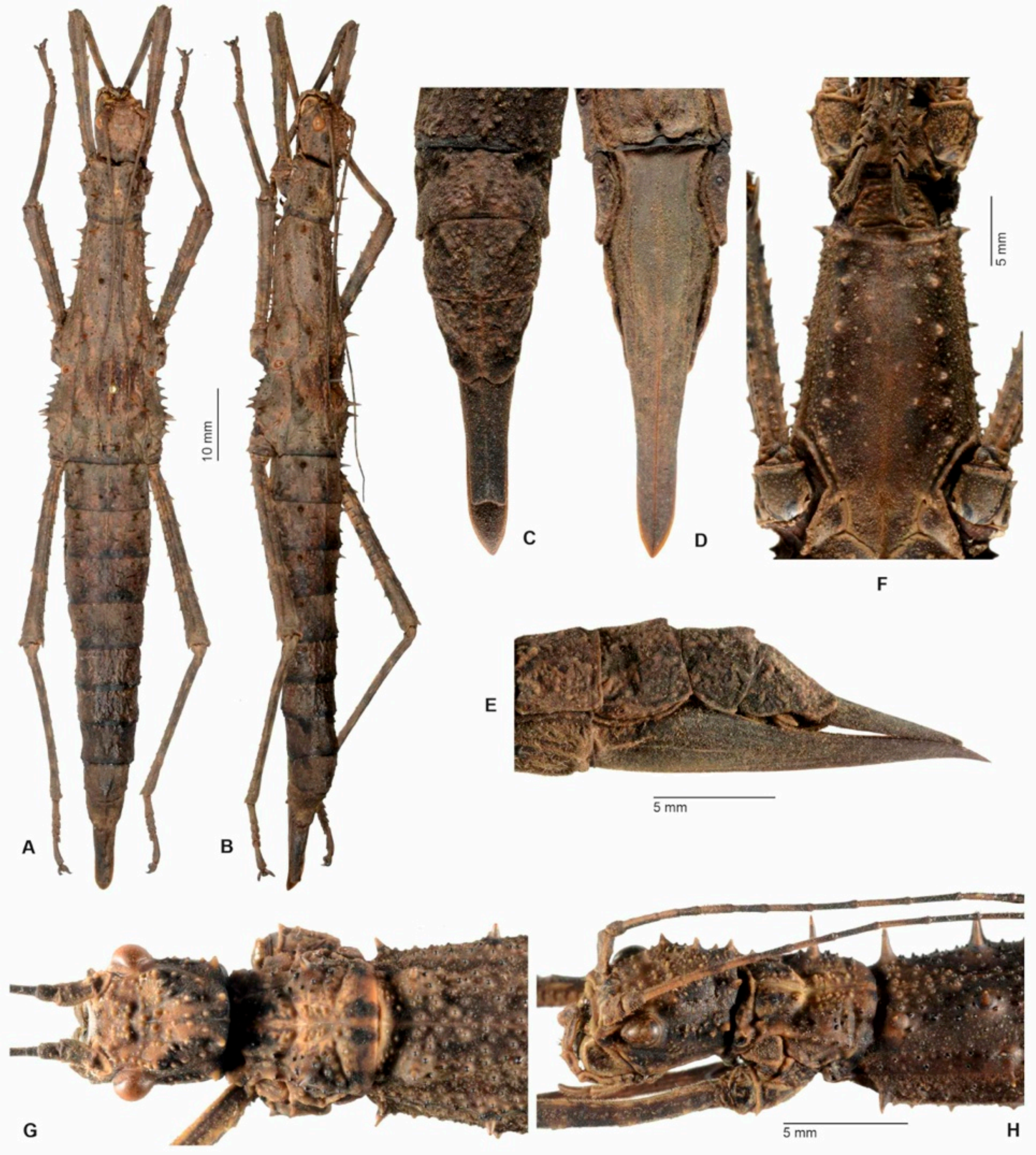

Fig. 20. *Brasidas viscayanus* Rehn & Rehn, 1939 ♀.

– **A**. Habitus, dorsal view (Mindanao, Agusan del Sur Prov., Esperanza) [FH 1432-2]. – **B**. Habitus, dorsolateral view (Mindanao, Agusan del Sur Prov., Esperanza) [FH 1432-2]. – **C**. Terminalia in dorsal view [FH]. – **D**. Terminalia in ventral view [FH]. – **E**. Terminalia in lateral view [FH]. – **F**. Mesosternum of ♀ [FH]. – **G**. Head, prothorax and anterior of mesothorax in dorsal view [FH]. – **H**. Head, prothorax and anterior of mesothorax in dorsolateral view [FH].

Brasidas waray **n. sp.**

(Fig. 22 & 70N)

ZooBank: https://zoobank.org/4C45C1B9-C80C-4988-9448-BC3BBCBD3AC3

? *Brasidas samarensis*, Zompro 2004: 216, figs. 127a-b. (Misidentification of ♂ and ♀ from Mount Balocaue, Leyte Id.)

HT, ♀: Philippinen, Eastern Visayas, Prov. Leyte, Leyte Island, Mahaplag Munip., local collector IV.2010 [RBINS, ex coll. FH No. 0819-1].

Differentiation. – The ♀ (the only sex known) can best be compared with that of *B. viscayanus* from Minadanao with which it agrees in the general form and appearance and basic armature. It is however separable by having all the cephalic and body armature much reduced, lacking lateral coronals and anterior laterals on the metapleurae, as well as the posterior pair of spines and medio-lateral spine of abdominal terga II-IV seen in *viscayanus*, more uniformly sized and less numerous supra-coxals of the metapleurae and almost smooth abdominal tergum IX (with a distinct protuberance in *viscayanus*). Moreover, the epiproct and subgenital plate are relatively longer and the metasternal foramina are less deep and open-oval pits, whereas they are asymmetrically tear-shaped, very deep and cingulate holes in *viscayanus*.

Etymology. – Named after the Waray people (or Waray-Waray people), who inhabit the northern part of the island of Leyte

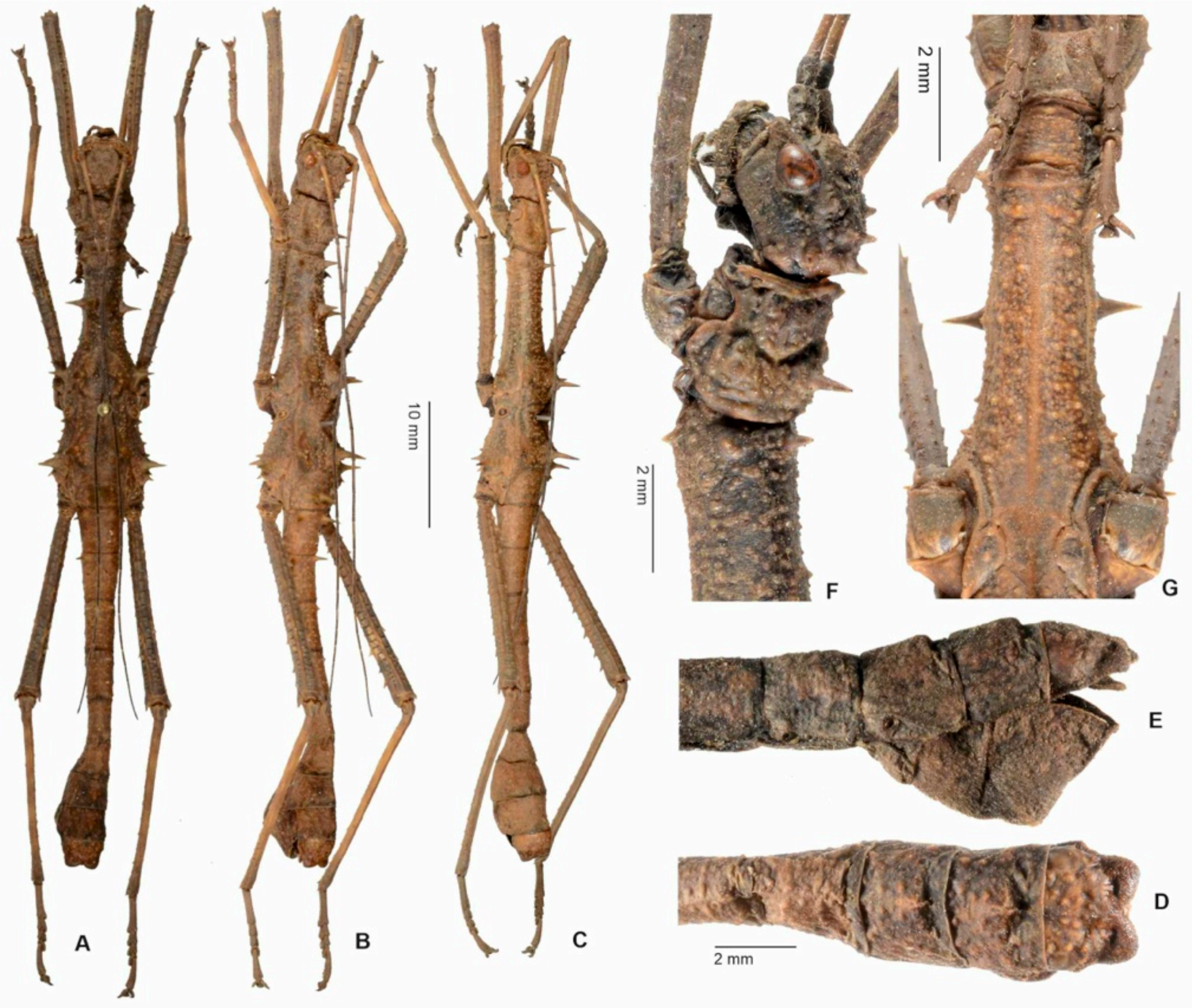

Fig. **21**. *Brasidas viscayanus* Rehn & Rehn, 1939 ♂.

– **A**. Habitus, dorsal view (Mindanao, Agusan del Sur Prov., Sibagat) [FH 1432-5]. – **B**. Habitus, dorsolateral view (Mindanao, Agusan del Sur Prov., Sibagat) [FH 1432-5]. – **C**. Habitus of specimen without median mesonotal spines, dorsolateral view (Mindanao, Agusan del Sur Prov., Sibagat) [FH 1432-6]. – **D**. Terminalia in dorsal view [FH]. – **E**. Terminalia in lateral view [FH]. – **F**. Head, prothorax and anterior of mesothorax in dorsolateral view [FH]. – **G**. Mesosternum [FH].

including the Mahaplag municipality, where they are called Leyteños and form a significant population.

Description

The following description is based on the unique dried holotype, which however seems to have the colour very well preserved.

♀ (Fig. 22)

Form and colouration. – Size rather large (body length 103.5 mm), form rather slender with the elements of armature quite poorly developed if compared to congenerics; body surface otherwise moderately granular. Colouration fairly plain fuscous with faint darker mottling; a very faint and washed olive pre-median lateral marking on pronotum, and a similar pre-posterior lateral marking on meso- and metanotum; the posterior mesonotals, posterior metanotals and mesopleural spines olive but with the tip yellow. Limbs irregularly flecked with buff.

Head. – Scarcely longer than wide, subrectangular with vertex gently rounded; supra-antennals small, the supra-orbitals more pronounced and conical and a few rather irregularly dispersed supra-orbitals and occipital medials present. The occipitals and median coronals roughly equal in size, moderately distinct, obtusely conical and roughly forming a quadrate; the lateral coronals much reduced and almost wholly wanting; genae only with 2-3 gulars represented as node-like granules. Eyes projecting almost hemispherically and their diameter corresponding to a little less than half the length of gena. Antennae with 29 joints and reaching to abdominal segment III; scapus compressed dorsoventrally and oval in outline, pedicellus globose, III notably longer than pedicellus, III very short and the following gradually increasing in the length with the median antennomeres in particular strongly elongate.

Thorax. – Pronotum about as long but slightly narrower than head and with a distinct pre-median narrowing; notably longer than wide. Armed with a prominent pair of fairly acute medial spines just behind the rather shallow and widely V-shaped transverse median sulcus; anterior margin with weakly developed, conical anterior mesal and antero-lateral tubercles. Mesothorax notably widening towards the posterior, elongate and about 2.75x longer than prothorax; the mesonotum with lateral margins notably concave in posterior one-third and almost 2.5x wider than long. Mesonotum with a moderately distinct pair of anterior and pre-median spines and a slightly smaller pre-lateral spine; a small and more narrowly spaced pair of median mesonotals present and the poster mesonotals distinct, pointed and surrounded by 3-4 small spiniform tubercles. Posterior metanotals similar but metanotum otherwise only with a small conical pair of antero-lateral metanotals; metanotum weakly trapezoidal in outline. Mesopleurae with a rather prominent spinose antero-lateral, and slightly smaller medio-lateral and two posterior-laterals; notably smaller but unequally sized tubercles are placed in between these spines; meso-pleural rather large and spinose. Metapleurae with a large spinose metapleural and six distinct and pointed supra-coxal spines, that slightly

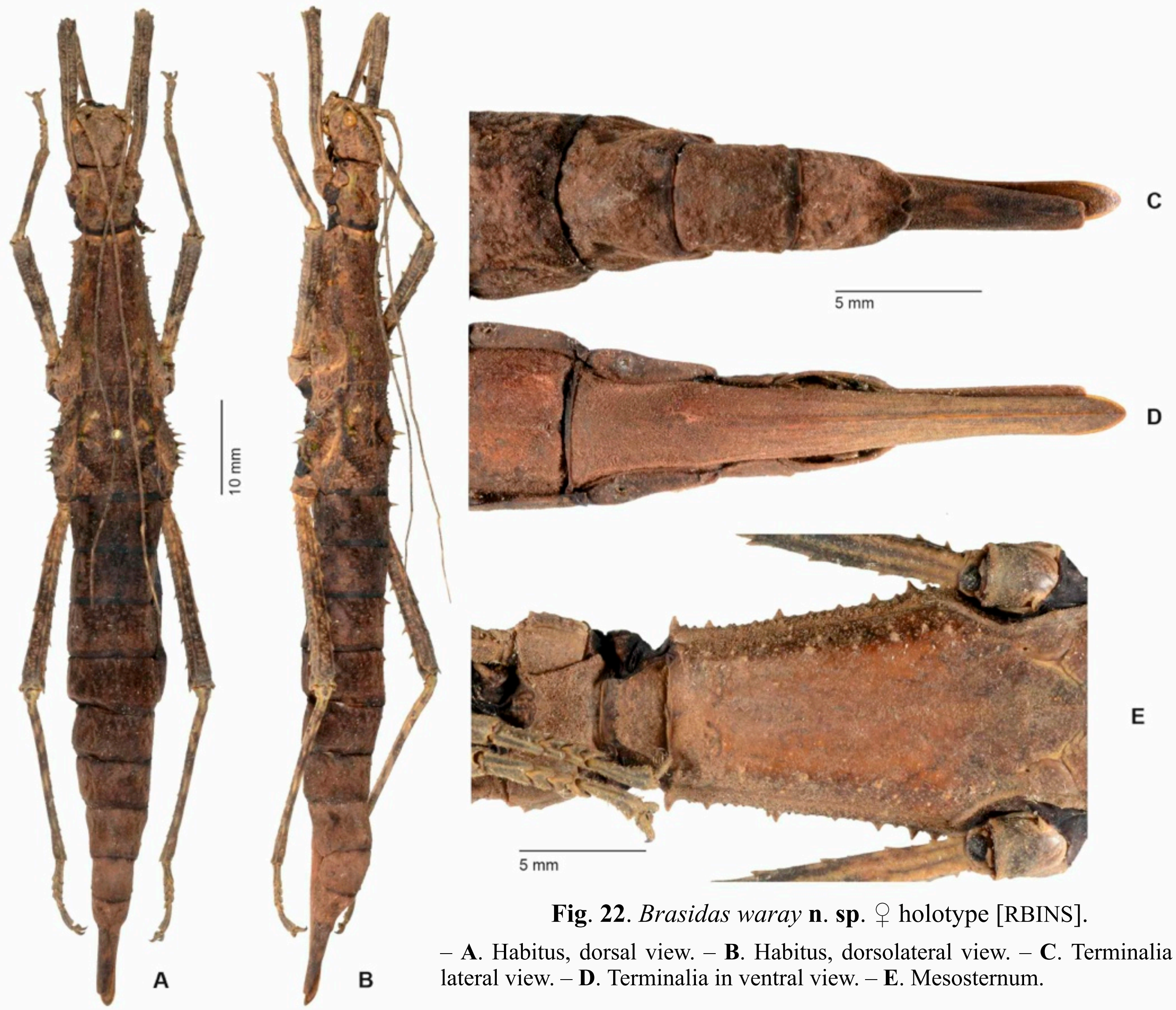

Fig. 22. *Brasidas waray* **n. sp.** ♀ holotype [RBINS]. – **A**. Habitus, dorsal view. – **B**. Habitus, dorsolateral view. – **C**. Terminalia in lateral view. – **D**. Terminalia in ventral view. – **E**. Mesosternum.

decrease in size towards the posterior of metapleurae. Mesosternum smooth except for rather low and tuberculate mesosternal and some scattered granules close to lateral margins (Fig. 22E). Metasternum only with two node-like metasternals; the pseudo-foramina of average size, just moderately deep, not fully cingulate and open posteriorly and basically oval in shape (Fig. 70N).

Abdomen. – Median segment distinctly transverse with anterior and lateral margins widely rounded, almost semi-circular in shape; armed with a small but spinose pair of medials. Segments II-V roughly uniform in width and length and about 1.8x wider than long; VI-X gradually narrowing with VIII basically trapezoidal and IX scarcely longer than wide. Terga unarmed except for a pair of latero-anterior spines, which is distinct on II and III but notably decreases in size on IV and V and is merely tuberculate on V. Sterna smooth; praeopercular organ on sternum VII formed by a median notch of posterior margin and a small pit some distance in front of margin (Fig. 22D). Tergum IX only with a very small, obtuse posteromedian tubercle. Anal segment longer than wide, obtusely and weakly tectate longitudinally with the lateral margins arcuate in posterior half and with a shallow emargination medially; the posterior margin obtusely bi-dentate with a distinct V-shaped median emargination. Epiproct about 1.3x longer than anal segment, weakly tectate and slightly gradually narrowing towards a narrow, obtusely angular tip (Fig. 22C). Subgenital plate elongate, lanceolate, distinctly keeled in the apical half with apex narrowly rounded and slightly surpassing epiproct (Fig. 22D).

Legs. – Relatively slender, basal flexure of profemora distinct. Profemora with three moderately distinct spiniform teeth in apical half of two ventral carinae; dorsal carinae with a few small dentations. Meso- and metafemora basically with about six teeth on all four carinae, these more spiniform on ventral carinae of metafemora and mostly with a small intercalated tooth. Medioventral carina of meso- and metafemora notable and with 6-8 small spiniform tubercles in basal half, which gradually disappear towards the apical one-third. Meso- and metatibiae with rather minute dentations ventrally, smooth dorsally. Basitarsus almost as long as three proceeding tarsomeres.

Measurements [mm]. – Body 103.5, pronotum 7.2, mesonotum 17.0, metanotum 8.2, median segment 3.8, profemora 16.4, mesofemora 14.3, metafemora 22.0, protibiae 17.2, mesotibiae 14.1, metatibiae 23.9, antennae 57.0.

Remarks. – The ♂ and ♀ recorded and illustrated as *Brasidas samarensis* by Zompro (2004: 216, figs. 127a-b) are apparently misidentified and may represent this new species. The ♂ has very prominent but slender thoracic spines and paired spines on abdominal terga II-III and there is a fairly distinct pair of median mesonotals. Unfortunately, the specimens are within the personal collection of O. Zompro (Berlin) and could not be examined to evaluate their identity. Males and eggs unknown.

Distribution. – Leyte, endemic.

Genus ***Eubulides*** Stål, 1877

Differentiation. – This genus morphologically most closely resembles the Mindanaoan *Armadolides* **n. gen.** and *Heterocopus* Redtenbacher, 1906 from the Palau Islands. From *Armadolides* **n. gen.** it however readily differs by the strongly reduced armature, lacking median pronotal spines, posterior meso- and metanotals and spines on the

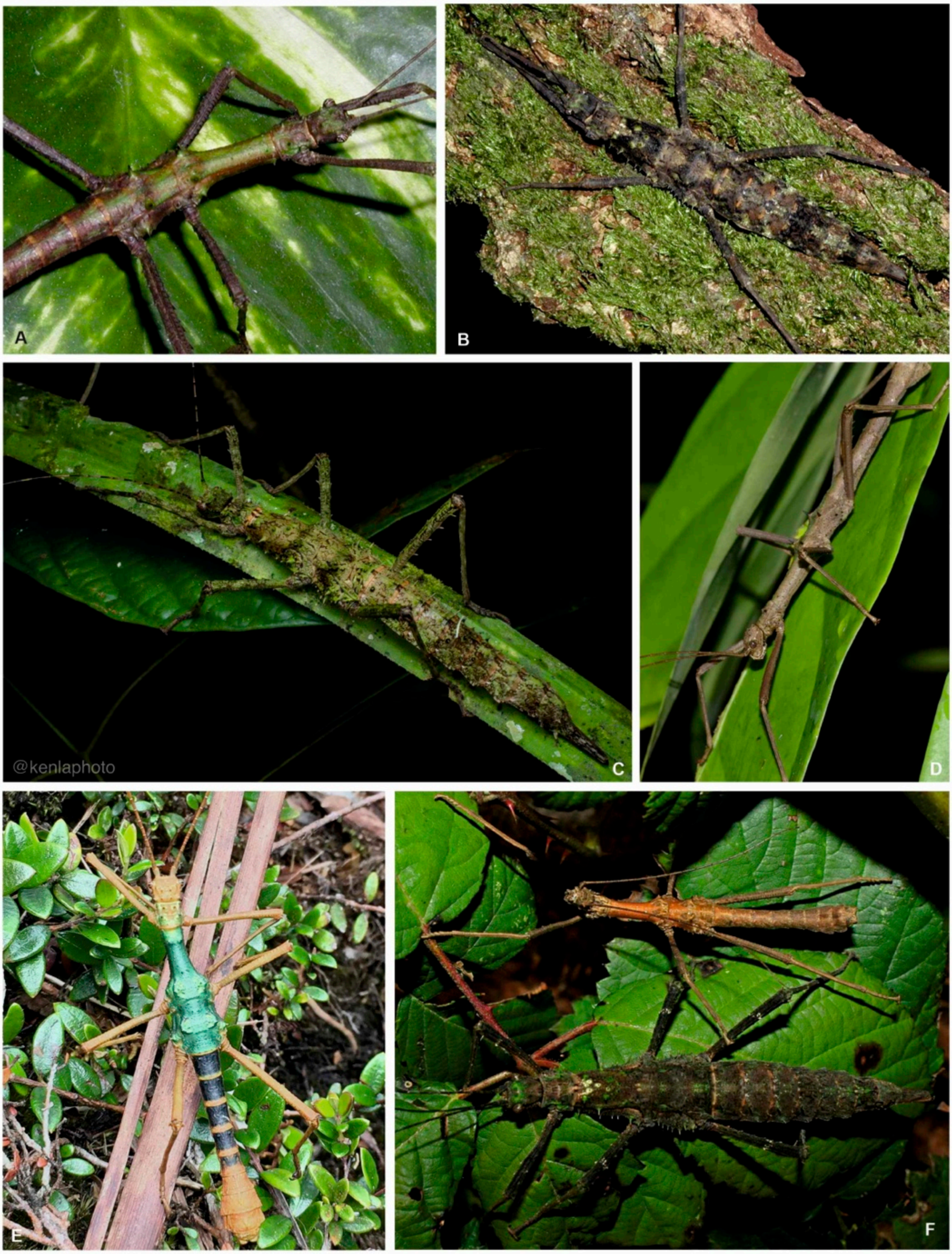

Fig. **23**. *Brasidas* spp. Live insects.

– **A**. *B. samarensis* Rehn & Rehn, 1939 ♂ (reared). – **B**. *B. samarensis* Rehn & Rehn, 1939 ♀ (reared). – **C**. *B. viscayanus* Rehn & Rehn, 1939 ♀ (Gingoog City, Misamis Oriental Prov., Mindanao) [© Kenneth Chin, https://www.inaturalist.org/observations/137767002). – **D**. *B. samarensis* Rehn & Rehn, 1939 ♂ (E-Samar, Can-Avid) [© J. D. Manthey, https://www.inaturalist.org/observations/42267309]. – **E**. Remarkably colourful new species of *Brasidas* at Mount Hamiguitan Wildlife Sanctuary, Davao Oriental Province, E-Mindanao [© Pepito Melendres, https://www.inaturalist.org/observations/32263469]. – **F**. *B. samarensis* Rehn & Rehn, 1939 Captive reared couple with ♂ showing brown colour form [© Holger Dräger].

Keys to the species of *Eubulides*

♂

1. Body length > 45.0 mm; lateral margins of pronotum unarmed; no enlarged spines at anterior margin of mesonotum **2**
— Smaller (body length < 40.0 mm); pronotum with lateral margins spinose; anterior margin of mesonotum with four large spines (Fig. 29E); Luzon . . . . ***igorrote***

2. Posterior portions of mesothorax and metathorax as well as meso- and metafemora distinctly inflated **3**
— Posterior portions of meso- and metathorax not inflated; meso- and metafemora slender **4**

3. Body length < 55.0 mm; anterior margin of pronotum with four large tubercles (Fig. 24E); Luzon . . . . ***alutaceus***
— Larger (body length > 60.0 mm); tubercles at anterior margin of pronotum small, mesal pair missing; Polillo Island . . . . ***taylori***

4. Head about as long as prothorax; mesothorax notably longer than head and prothorax combined **5**
— Head 1.5x longer than prothorax (Fig. 27D); mesothorax scarcely longer than head and prothorax taken together; Mindanao . . . . ***constanti* n. sp.**

5. Meso- and metanotum and sterna not distinctly tectate medio-longitudinally; mesosternals indistinct; Luzon and/or Leyte **6**
— Meso- and metanotum and sterna distinctly tectate medio-longitudinally (Fig. 26E); mesosternum with six Prominent mesosternal tubercles (Fig. 26F); Mindanao . . . . ***blaan* n. sp.**

6. Large (body length > 55.0 mm); posterior margin of anal segment distinctly bilobed (Fig. 32F); vomer with a strong and fairly straight terminal point; North Luzon . . . . ***lumawigi* n. sp.**
— Smaller (body length < 55.0 mm); anal segment hexagonal with only a shallow posteromedian emargination (Fig. 35J); terminal hook of vomer strongly arched (Fig. 72E); Luzon & Leyte . . . . ***timog* n. sp.**

♀*

1. Body length > 60.0 mm; lateral margins of pronotum unarmed; no enlarged spines at anterior margin of mesonotum **2**
— Smaller (body length < 60.0 mm); pronotum with lateral margins spinose; anterior margin of mesonotum with four large spines (Fig. 28E); Luzon . . . . ***igorrote***

2. Meso- and metathorax not tectate; mesothorax notably narrowed towards anterior **3**
— Meso- and metanotum and sterna distinctly tectate medio-longitudinally (Fig. 26B); mesothorax with lateral margins almost parallel; Mindanao . . . . ***blaan* n. sp.**

3. Posterior portions of meso- and metathorax tumescent; meso- and metafemora distinctly inflated and > 2x bulkier than corresponding tibiae **4**
— Meso- and metathorax flat posteriorly; meso- and metafemora not distinctly inflated and just moderately bulkier than corresponding tibiae **5**

4. Body length < 75.0 mm; anterior margin of pronotum with four large tubercles; posteromedian protuberance of abdominal terga VIII and IX indistinct; dorsal carinae of meso- and metafemora smooth . . . . ***alutaceus***
— Larger (body length > 90.0 mm); tubercles at anterior margin of pronotum small, the mesal pair missing; abdominal terga VIII and IX with a large posteromedian protuberance (Fig. 33E); dorsal carinae of meso- and metafemora with a few small teeth (Fig. 33B); Polillo Island . . . . ***taylori***

5. Body length usually < 76.0 mm; posterior margin of anal segment indented medially (Fig. 35F); ovipositor no more than 1.8x length of anal segment (Fig. 35E-F); South and East Luzon & Leyte . . . . ***timog* n. sp.**
— Larger; posterior margin of anal segment rounded (Fig. 31F); ovipositor elongate with epiproct 2x longer than anal segment (Fig. 31F, H); North Luzon . . . . ***lumawigi* n. sp.**

* The ♀ of *E. constanti* **n. sp.** is not known.

abdominal terga II-V. From *Heterocopus* ♀ of *Eubulides* may be differentiated by the more uniform body width (metathorax strongly widening towards the posterior and trapezoidal in outline, with the metapleurae expanded and tuberculose in *Heterocopus*), not raised posterior margin of the head; lack of a prominent pair of posterior mesal pronotal spines; ± up-curved ovipositor, much less distinct praeopercular organ that is only represented by a posteromedian hole or pit on abdominal sternum VII (a distinct and deep indention of the posterior margin in *Heterocopus*) and less pronounced armature of the extremities. Males of *Heterocopus* mainly differ from those of *Eubulides* by the tuberculose metapleurae which are notably expanded posteriorly and the more distinct spination of the extremities. The up-curved ovipositor is shared with *Theramenes* Stål, 1875, but ♀ this genus readily differs from *Eubulides* by the much stockier body, transverse abdominal segments and thickened metafemora.

Remarks. – Hennemann *et al.* (2016: 18) placed this genus along with *Heterocopus*, *Mearnsiana* Rehn & Rehn, 1939 and *Theramenes* in the *Theramenes*-group of Obriminae, which is characterized by the increasing simplicity of the body armature, lack of posterior mesonotal and metanotal spines, flattened and weakly armed to unarmed head, and increasingly thickened metafemora (♂ in particular). An updated key to the species is here presented to incorporate the three newly described species. The numerous citations of *Eubulides* may be referred to in the Phasmida Species File (http://Phasmida.SpeciesFile.org).

There is at least one further still undescribed species on the island of Luzon, which is only at hand from a unique somewhat incomplete ♂ in the author's personal collection. Moreover, the species illustrated and misidentified as *E. taylori* Rehn & Rehn, 1939 by Acola *et al.* (2022) from the island of Polillo is like to represent another as yet undescribed species (see explanation below). Both are morphologically very close to the here newly described *E. timog* **n. sp.** from southern Luzon.

Distribution. – Philippines, endemic. So far recorded from the islands of Luzon, Leyte, Mindanao and Polillo.

Species included

1. ***Eubulides alutaceus*** Stål, 1877: 68.
Distribution: **"**Philippines".

2. ***Eubulides blaan*** **n. sp.**
Distribution: Mindanao.

3. ***Eubulides constanti*** **n. sp.**
Distribution: Luzon.

4. ***Eubulides igorrote*** Rehn & Rehn, 1939: 408, pl. 31: 4.
Distribution: Luzon.

5. ***Eubulides lumawigi*** **n. sp.**
Distribution: Luzon.

6. ***Eubulides taylori*** Rehn & Rehn, 1939: 410, pl. 31: 1, 2, 10.
Distribution: Polillo.

7. ***Eubulides timog*** **n. sp.**
Distribution: Luzon & Leyte.

Eubulides alutaceus Stål, 1877

(Fig. 24)

Eubulides alutaceus Stål, 1877: 68.

LT (by present designation), ♂: Ins. Philipp; Semper; Typus; *alutaceus* Stål [NHRS];

PLT, ♀: Ins. Philipp; Semper; Allotypus; *Eubulides alutaceus* Stål [NHRS].

- Kirby, 1904: 395.
- Redtenbacher, 1906: 38.
- Bruner, 1915: 229.
- Sjöstedt, 1933: 2. (type data)
- Rehn & Rehn, 1939: 408.
- Zompro, 2004: 209.
- Otte & Brock, 2005: 136.
- Brock & Büscher, 2022: 521.

Material examined

1 ♂: Lagonoy, Camararines Sur, Bicol, South Luzon, I.2010, Lumawig [RBINS].

Differentiation. – This species, the type-species of *Eubulides*, is most similar to *E. taylori* Rehn & Rehn, 1939 from the island of Polillo but differs by the notably smaller size. Females can be distinguished by the less pronounced cephalic tubercles, four more prominent anterior tubercles of the pronotum, less distinct tubercles of the meso- and metapleurae, smaller posteromedian protuberances of abdominal terga VIII and IX, relatively shorter ovipositor and smooth dorsal carinae of the meso- and metafemora. Males may be separated from those of *taylori* by the less distinctly inflated posterior portions of the meso- and metathorax (Fig. 24E), more prominent anterior tubercles of the pronotum and more indented posterior margin of the anal segment (Fig. 24F).

Remarks. – Originally described from a ♂ and ♀ from "Philippines" in the collection of NHRS, the ♂ at hand from the collection of RBINS is the first definite record of this species and proves the species to be from the island of Luzon. Stål's ♂ in NHRS is here selected as the lectotype to guarantee stability of *alutaceus*. Detailed illustrations of the ♂ in RBINS are here provided to supplement the original description. Body length ♀ 73.0 mm, ♂ 52.0 mm.

Distribution. – "Philippines" [NHRS – type locality]. S-Luzon, Bicol, Province Camarines Sur (Lagonoy [RBINS]).

Eubulides blaan **n. sp.**

(Fig. 25-26 & 72E)

ZooBank: https://zoobank.org/FB4EA8A6-C258-4FAB-96D2-7D1B8B7F526A

HT, ♀: Philippinen, Mindanao Id., Agusan del Sur Prov., Esperanza Munip., Kalabuan, 385 m, local collector VII.2002 [RBINS, ex coll. FH].

PT, ♀: Philippinen, Mindanao Id., Agusan del Sur Prov., Esperanza Munip., Kalabuan, 385 m, local collector XI.20011 [FH, No's 1259-1].

PT, **3** ♀, **1** ♂, **1** ♀ (penultimate instar): Philippinen, Mindanao Id., Agusan del Sur Prov., Esperanza Munip., Kalabuan, 385 m, local collector VII.2002 [FH, No's 1259-2 to 6].

PT, **3** ♀, **4** ♂, **1** ♀ (juvenile): Philippinen, Mindanao Id., Agusan del Sur Prov., Esperanza Munip., Kalabuan, 385 m, local collector VIII-IX.2011 [FH, No's 1259-7 to 14].

PT, **1** ♀, **1** ♂, **1** egg: Philippinen, Mindanao Id., Agusan del Sur Prov., Sibagat Munip., *ca.* 50 m, local collector III.2002 [FH, No's 1259-15, 16 & E].

PT, **3** ♂: Philippinen, Mindanao Id., Agusan del Sur Prov., Sibagat Munip., *ca.* 50 m, local collector IX.2002 [FH, No's 1259-17 to 19].

PT, **1** ♀: Philippinen, Mindanao Id., Lanao del Sur Prov., Kapatagan Munip., local collector III.2002 [FH, No's 1259-20].

Differentiation. – This new species most closely resembles *E. lumawigi* **n. sp.** from the island of Luzon with which it shares the reduced body armature. Both sexes can however readily be separated from that species by the distinct, obtuse medio-longitudinal carina of the meso- and metanotum and sterna, which thereby are notably tectate longitudinally (Fig. 26A-F). Females may also be differentiated from those of *lumawigi* by having the almost parallel lateral margins of the mesothorax (notably narrowing towards the anterior in *lumawigi*), notably more expanded meso- and metapleurae, distinct posteromedian indention of the anal segment (Fig. 26H, rounded in *lumawigi*), narrower slit of the praeopercular organ (Fig. 26J), somewhat shorter

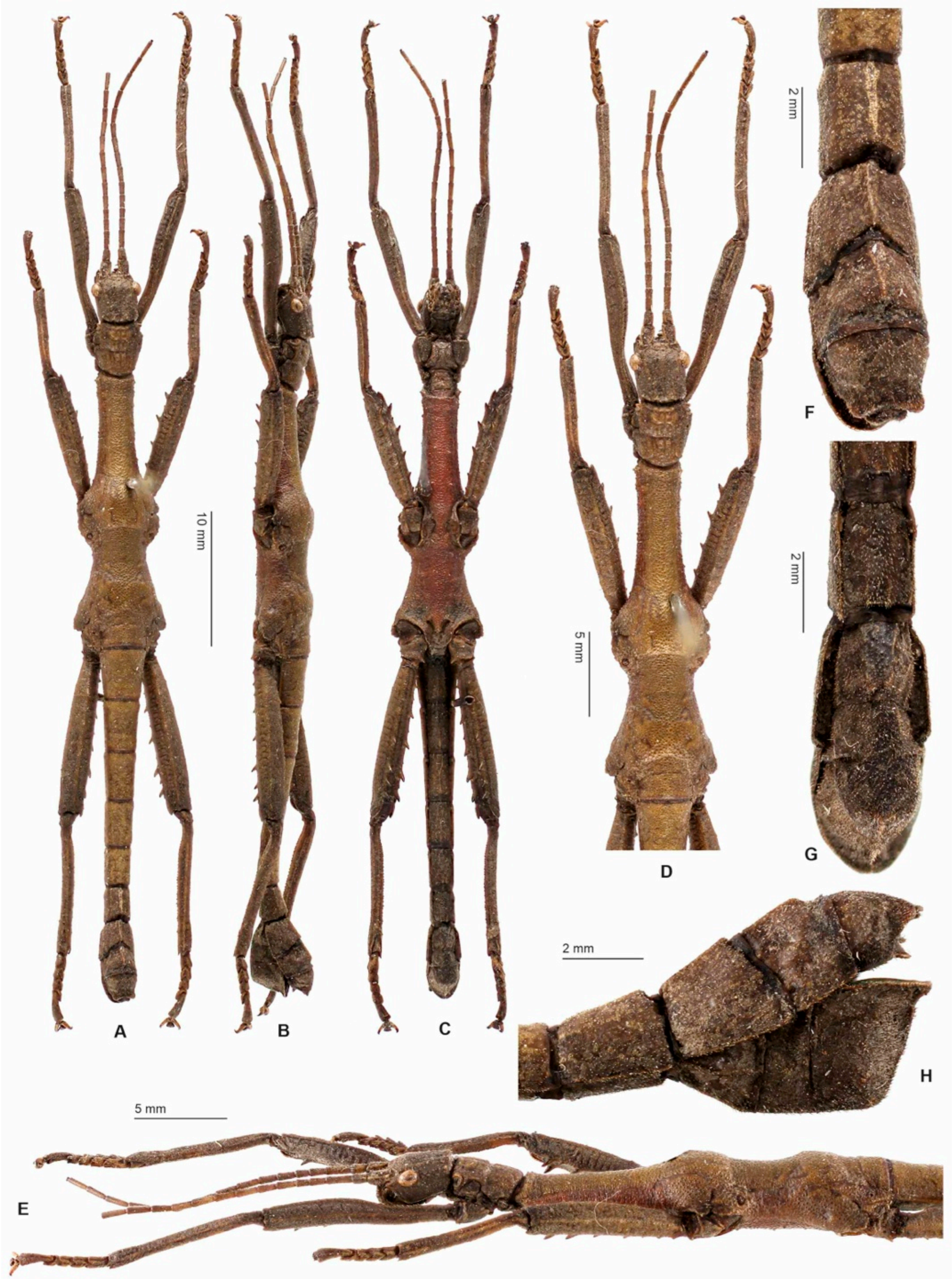

Fig. 24. *Eubulides alutaceus* Stål, 1877 ♂ from S-Luzon, Bicol Region, Lagonoy [RBINS, © Jerome Constant]. – **A**. Habitus dorsal view. – **B**. Habitus lateral view. – **C**. Habitus ventral view. – **D**. Head and thorax in dorsal view. – **E**. Head and thorax in lateral view. – **F**. Terminalia in dorsal view. – **G**. Terminalia in ventral view. – **H**. Terminalia in lateral view.

ovipositor which is slightly less than 2x the length of the anal segment (Fig. 26G-H) and just weakly developed posteromedian protrusion of abdominal terga VIII and IX, which may occasionally be wanting on VIII (Fig. 26G). Males have the mesonotum slightly shorter (3.1x *vs.* 3.3x longer than prothorax in *lumawigi*), the mesosternals very prominent (Fig. 26F, only low tubercles in *lumawigi*), the spines on the ventral carinae of the meso- and metafemora are somewhat more pronounced, the posterior margin of the anal segment merely has a small median indention (Fig. 26L, distinctly bilobed with a deep triangular excavation in *lumawigi*), the poculum is comparatively smaller and the vomer has a distinctly arched terminal hook (Fig. 72E, a straight and conical terminal point in *lumawigi*).
The egg differs from that of *timog* by the somewhat larger dimensions, being cylindrical in cross-section (oval in *timog*), having the anterior portion of the micropylar rather rounded than angular and the apex of the two posterior extensions fairly acute, as well as by lacking the setae of the operculum seen in *timog*.

Etymology. – Named after the Blaan people, indigenous people of Southern Mindanao and neighbours of the T'boli. They are famous for their brass works, beadwork as well as their tabih weave and people of these tribes wear colourful embroidered native costumes and beadwork accessories.

Description

A medium sized species for the genus with the general form rather slender and uniform in body width, the body surface densely granulose but just sparsely tuberculate; the legs relatively slender and elongate. Thorax with dorsal and ventral side distinctly tectate medio-longitudinally. The colouration is described solely from dried specimens.

♀ (Fig. 25A-D)

Form and colouration. – Medium sized (body length 69.0-84.0 mm), rather slender and body fairly uniform in diameter. Colour varying from light to mid yellowish to reddish brown and fairly uniform. Upper margins and apex of subgenital plate blackish.

Head. – Subcylindrical, about 1.5x longer than wide with the vertex flattened; surface rough and granular, the median and lateral coronals moderately developed and obtusely spinose, the 3-4 gulars small (Fig. 26A-B). Eyes slightly oval and their length contained 2.3x in length of genae. Antennae with 28 joints and reaching to posterior of median segment. Scapus flattened dorso-ventrally with interior margin noticeably rounded, pedicellus scarcely shorter than scapus and tapering towards apex, III longer than IV and V.

Thorax. – Pronotum about as wide but notably shorter than head and somewhat constricted medially with the transverse median sulcus deeply impressed and widely W-shaped; surface unevenly tuberculose and granulose (Fig. 26B). Antero-mesal pronotals spiniform, the antero-laterals small. A distinct pair of obtuse posterior mesal pronotal tubercles present just in front of median sulcus (Fig. 26A). Meso- and metanotum granular and with a prominent, obtuse medio-longitudinal keel that is covered by somewhat more pronounced, shiny granules (Fig. 26B). Mesonotum with a small pair of anterior mesal tubercles, about 2.6x longer than wide and rectangular except for a slight narrowing post-medially. Metanotum subquadrate. Meso- and metasternum obtusely tectate medio-longitudinally and with about five (mesosternum, Fig. 26C) or two pairs (metasternum) of obtusely conical tubercles. Mesopleurae notably expanded and more so towards the anterior; both pleurae with numerous irregular tubercles along the mid-line, the three anterior ones of the mesopleurae more or less spiniform (Fig. 26A-C).

Abdomen. – Median segment with anterior margin widely rounded and > 2x wider than long; surface with the same medio-longitudinal keel seen on meso- and metanotum. Segments II-VII roughly uniform in width, II and III equal in length, IV-VII slightly decreasing in length and becoming increasingly transverse; all terga with a weakly indicated medio-longitudinal bulge but without any hint of tubercles. Sterna II-VI each with two pairs of blunt tubercles that roughly form a quadrate. Praeopercular organ on sternum VII formed by a distinct, cingulate median pit near posterior margin, which is very weakly bi-labiate medially (Fig. 26J). Terga VIII and IX with a weakly bi-globose posteromedian swelling, that is occasionally wanting on VIII (Fig. 26G). Anal segment weakly tectate and narrowing towards a slightly indented posterior margin (Fig. 26H); the lateral margins with a concave excavation medially (Fig. 26G). Cerci small and compressed laterally. Epiproct almost 2x longer than anal segment, up-curved, gradually narrowing towards a slender but blunt tip and weakly tectate medio-longitudinally. Subgenital plate elongate, lanceolate, navicular and up-curved with the median keel distinct and the apex acutely pointed (Fig. 26G-H) and slightly surpassing tip of epiproct; basal portion setose and apical portion increasingly glossy in appearance.

Legs. – All coxae with a ventral spine at posterior margin, this particularly distinct on metacoxae which bear another but much smaller spiniform projection at the base. Profemora smooth dorsally and with three spinose teeth in apical half of two outer ventral carinae. Dorsal carinae of meso- and metafemora with about six (mesofemora) to nine (metafemora) teeth, which are much more pronounced with the three basal ones rather spiniform on metafemora. Medioventral carina of meso- and metafemora only indicated by a few small granules. Two exterior ventral carinae of mesofemora with 6-7 spiniform teeth that gradually increase in size towards the apex of femur. Metafemora armed with about eight rather distinct but slender spines on two exterior ventral carinae,

	♀, HT [IMQC]	**♂, PT**	**♀, PT**
Body	80.0	52.0-56.8	69.0-84.0
Pronotum	5.4	4.1-4.3	4.3-5.7
Mesonotum	15.9	12.2-12.6	12.5-15.5
Metanotum	7.0	5.6-5.8	5.9-6.3
Median segment	3.1	2.6-2.7	2.7-3.2
Profemora	13.3	10.2-11.1	12.0-13.5
Mesofemora	11.2	8.9-9.5	10.6-11.4
Metafemora	15.6	11.7-12.2	14.0-15.4
Protibiae	13.2	10.2-10.4	11.1-12.8
Mesotibiae	10.6	7.9-8.5	9.9-10.7
Metatibia	15.9	11.0-11.6	14.8-15.8
Antennae	38.0	30.0-33.0	32.0-39.0

Table 2. Measurements of *Eubulides blaan* **n**. **sp**.

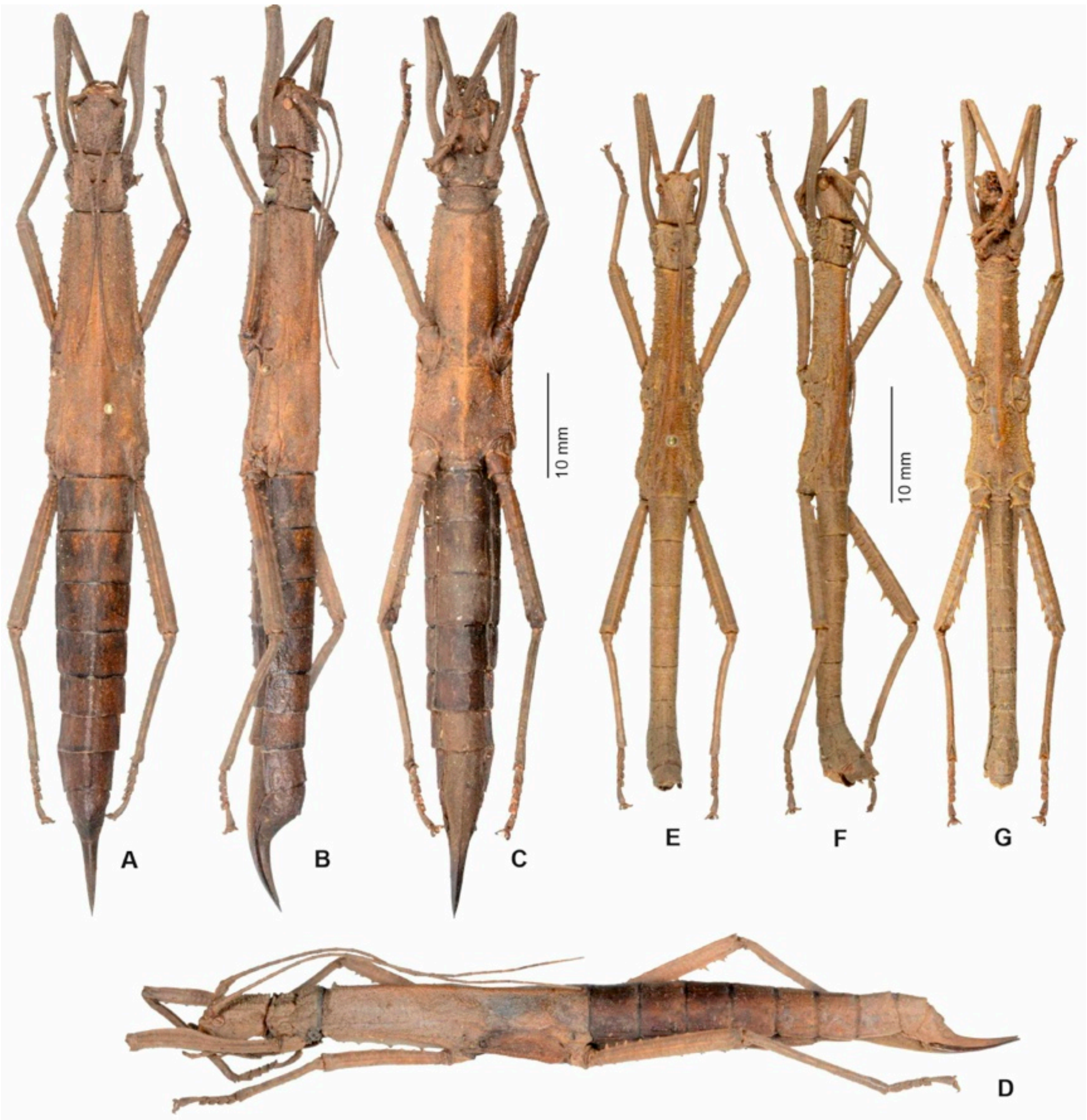

Fig. 25. *Eubulides blaan* **n. sp.** habitus.

– **A**. ♀ paratype, dorsal view [FH 1259-1]. – **B**. ♀ paratype, lateral view [FH 1259-1]. – **C**. ♀ paratype, ventral view [FH 1259-1]. – **D**. ♀ holotype, dorsolateral view [RBINS]. – **E**. ♂ paratype, dorsal view [FH 1259-16]. – **F**. ♂ paratype, lateral view [FH 1259-16]. – **G**. ♂ paratype, ventral view [FH 1259-16].

which gradually increase in size towards the apex; a notably smaller intercalated spine is present between the three apical spines. Protibiae wholly unarmed, meso- and metatibiae only with a few small denticulations ventrally. Tarsi stout and about half as long as corresponding tibiae.

♂ (Fig. 25E-G)

Form and colouration. – Moderately sized for the genus (body length 52.0-56.8 mm), form rather slender with the posterior portions of meso- and metathorax just weakly inflated. Body surface more distinctly granular than in ♀. Colour much as in ♀ but on average of slightly darker tones.

Head. – Basically, as in ♀ but the four coronals and gulars relatively more developed and acute (Fig. 26D-E). Antennae reaching to abdominal segment II.

Thorax. – All tubercles of pronotum notably more distinct and spinose than in ♀ and with two or three pairs of medial pronotals in front of transverse fissure (Fig. 26D-E). Mesothorax more narrowed in the anterior three-quarters, the mesonotum almost 4.3x longer than width at anterior margin and scarcely more than 3x the length of prothorax. Mesonotum granular and set with variably sized, enlarged obtuse tubercles that are roughly arranged in two longitudinal lateral rows; the anterior mesal and antero-lateral mesonotals moderately distinct, blunt and peg-like in shape (Fig. 26D-E). Metanotum subrectangular but without enlarged tubercles. Meso- and metapleurae with a medio-longitudinal row of obtuse tubercles which are less pronounced on metapleurae; the antero-lateral tubercle of mesopleurae rather spiniform. Mesosternum with six very prominent conical tubercles (Fig. 26F), metasternum only with four notably smaller tubercles.

Abdomen. – Median segment trapezoidal with anterior margin gently rounded. Segments II-VI very slightly narrowing, VII weakly trapezoidal; II and III equal in length, IV-VI slightly decreasing in length; on average about 1.4x longer than wide. Terga II-VII unarmed except for a variably developed but always small pair of postero-mesal tubercles; V-VIII with a pair of weak and closely spaced medio-longitudinal carinae. Sterna as in ♀ but the four paired tubercles smaller and sterna II-III with a fine medio-longitudinal carina. Anal segment hexagonal in dorsal aspect, wider than long, the lateral margins somewhat deflexed and angular and the posterior margin roundly angular with a minute median indention (Fig. 26L); outer ventral angles of posterior margin minutely dentate. Epiproct very small, broadly triangular. Cerci small, tapering towards a narrow tip and slightly compressed laterally. Vomer with basal portion broader than long and roundly triangular, the terminal hook moderately strong, rather short and weakly arched dextrally (Fig. 72E). Poculum moderately bulgy with a median carina in posterior half, the surface otherwise unevenly tuberculated; posterior margin with a medially indented, bi-labiate flange (Fig. 26M).

Legs. – Coxae as in ♀. Armature of limbs generally as in ♀ but the ventral spines of the meso- and metafemora in particular, relatively larger and stronger than in ♀.

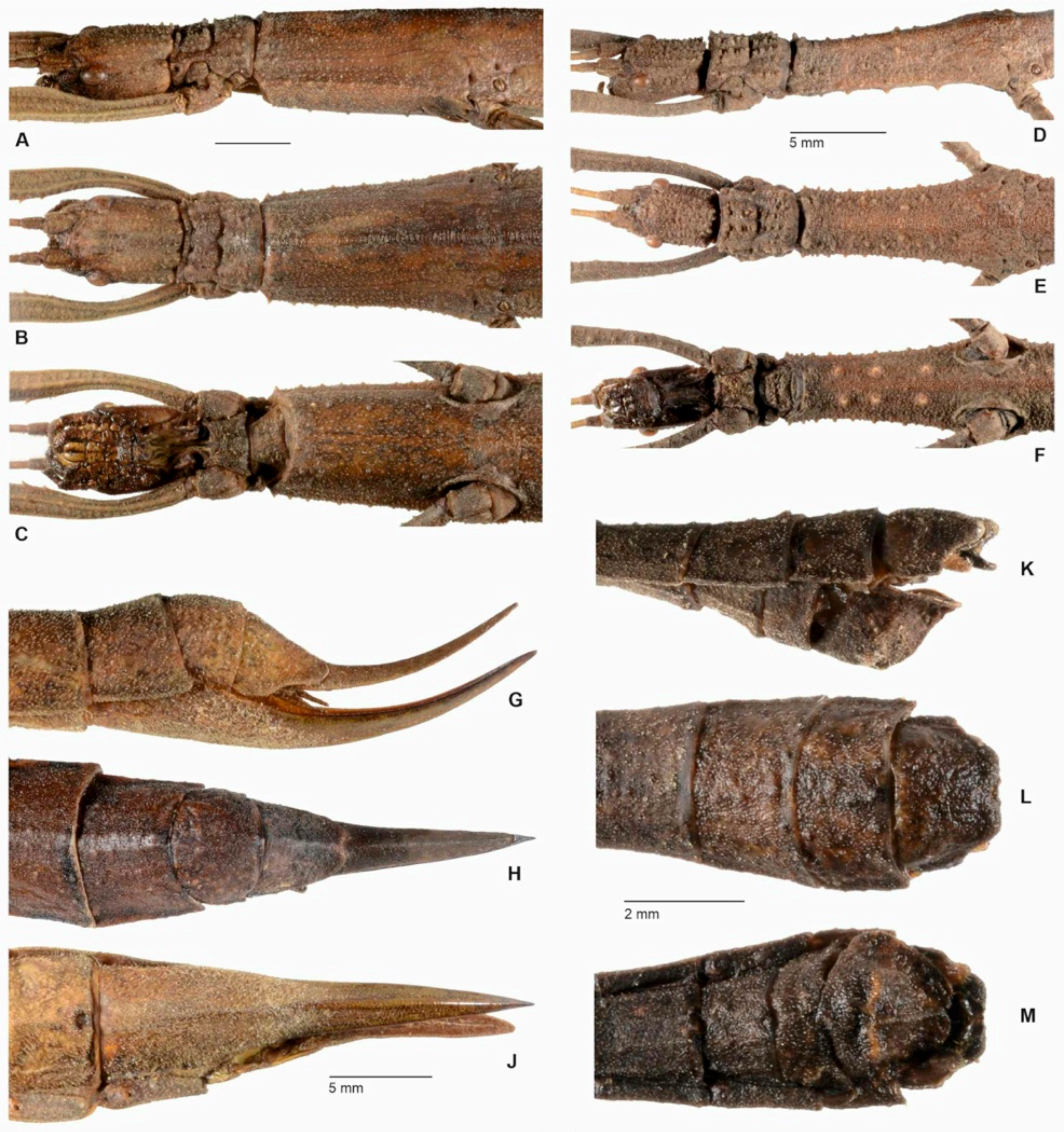

Fig. 26. *Eubulides blaan* **n. sp.**

– **A**. ♀ paratype, head, pro- and mesothorax lateral view [FH]. – **B**. ♀ paratype, head, pro- and mesonotum dorsal view [FH]. – **C**. ♀ paratype, head, pro- and mesosternum ventral view [FH 1259]. – **D**. ♂ paratype, head, pro- and mesothorax lateral view [FH]. – **E**. ♂ paratype, head, pro- and mesonotum dorsal view [FH]. – **F**. ♂ paratype, head, pro- and mesosternum ventral view [FH]. – **G**. ♀ paratype, terminalia lateral view [FH]. – **H**. ♀ paratype, terminalia dorsal view [FH]. – **J**. ♀ paratype, terminalia ventral view [FH]. – **K**. ♂ paratype, terminalia lateral view [FH]. – **L**. ♂ paratype, terminalia dorsal view [FH]. – **M**. ♂ paratype, terminalia ventral view [FH].

Variability. – No noteworthy variability is seen in the type-series, other than slight variation in size and number and development of the pro- and mesonotal tubercles. The unique ♀ from Sibagat has the posteromedian tubercle of the abdominal terga somewhat more pronounced than all other specimens and the ♀ from Kapatagan is shorter than the other specimens (body length 69.0 mm).

Egg

One egg could be extracted from the ovipositor of the ♀ paratype from Sibagat but was unfortunately damaged during that progress in which the posterior portion broke off. Nonetheless, it can serve well for a description but is not illustrated.

Elongate, slightly bullet-shaped, round in cross-section with polar end slightly narrowing; 2.8x longer than wide and 2.6x longer than high. Entire surface of capsule densely but finely pitted and somewhat rugulose anteriorly and posteriorly; the anterior margin with a slight bulge. Polar-area with a small protuberance in centre. Micropylar plate large and about 0.75x the length of capsule; shape basically roundly rectangular anterior end broadly rounded and posteriorly with a large and deep triangular median indention; the outer angles forming two narrowing and very weakly laterally directed extensions; surface like capsule and outer margin marked by a fairly broad but low bulge. Micropylar cup a small bowl-shaped structure with a low and obtuse swelling anteriorly. Median line a prominent raised bulge, which reaches to the central protuberance of the polar-area. Operculum slightly oval and very weakly convex; surface unevenly rugulose. Opercular angle ca. 8°. Colour plain grey, the operculum slightly darker. Measurements [mm]: Length 5.3, width 2.0, height 2.0, length of micropylar plate 4.1.

Distribution. – Mindanao, endemic. Province Agusan del Sur (Esperanza, Kalabuan, 385 m [RBINS, FH]; Sibagat [FH]); Province Lanao del Sur (Kapatagan [FH]).

Eubulides constanti **n. sp.**

(Fig. 27)

ZooBank: https://zoobank.org/1ED39608-0ED7-4C24-B475-476789C3B5A0

HT, ♂: Philippines, Mindanao, Mount Apo, 2008 [RBINS].

Differentiation. – Most closely resembling the second Mindanaoan species *E. blaan* **n. sp.** but ♂ (the only sex known) differing by the notably larger head, which is more 1.5x longer than the pronotum (Fig. 27D), relatively shorter mesothorax that is just scarcely longer than the head and prothorax taken together (Fig. 27D-E), less pronounced pronotal tubercles, less distinctly tectate mesosternum (Fig. 27B), more numerous, slender and pointed ventral spines of the femora and much more distinctly bilobed and medially indented posterior margin of the anal segment (Fig. 27F).

Etymology. – Named in honour of Jérôme Constant (RBINS) for his generosity and permitting use of several plates that he had compiled for an unpublished paper on the genus *Eubulides*. Moreover, Jérôme, who has published numerous papers on Indochinese Phasmatodea, shall be thanked for kindly arranging loans of specimens from the RBINS collection and his tremendous efforts in organising the annual phasmid meeting in the Royal Belgian Institute of Natural Sciences, Brussels since 2016.

Description

♂ (Fig. 27)

Form and colouration. – Medium sized (body length 46.6 mm) and rather stocky for the genus with a very large head if compared to congenerics; body armature weakly developed and body surface densely granular (the granules more distinct on thorax). Colour of the unique holotype plain greyish drab with the abdomen and tibiae buff and all granulations and tubercles of the body as well as the armature of the limbs ochre. Vertical portion of the poculum light grey. Antennae buff with some irregular, dark straw-coloured annuli and gradually becoming darker towards the apex.

Head. – Large, subcylindrical, parallel-sided and about 1.4x longer than wide with the vertex flattened (Fig. 27D-E); surface densely granular, the lateral coronals moderately developed, the median coronals broadly conical but low and posterior directed to give the posterior margin of the head a bi-dentate appearance; only two somewhat pronounced posterior gulars present. Coronal line noticeably impressed in posterior half of vertex (Fig. 27D). Eyes rather small, oval in outline, moderately projecting and length of eye fitting 2.1x in length of genae. Antennae with 26 joints and reaching to posterior margin of abdominal segment II. Scapus flattened dorso-ventrally with interior margin moderately rounded and about 1.5 longer than wide; pedicellus two-thirds the length of scapus and slightly tapering towards apex, III noticeably longer than pedicellus, IV and V; proceeding segments first increasing and in the apical one-quarter of antennae decreasing in length.

Thorax. – Pronotum only two-thirds the length of head, a little wider than long with the anterior margin somewhat widened and the lateral margin gently concave; the transverse median furrow deeply impressed and distinctly arched; surface unevenly tuberculose and granulose (Fig. 27D). Anterior half with a small pair of posterior mesal tubercles and a moderate pair of conical medial tubercles just in front of transverse furrow; the anterior margin set with a small pair of median tubercles and the anterior-lateral pronotals small (Fig. 27E). Mesothorax slightly widened posteriorly; the mesonotum about 3.2x longer than wide and rectangular, only with a few slightly more pronounced granules close to lateral margins (Fig. 27D). Metanotum slightly narrowed medially and lacking the enlarged lateral granules seen on the mesonotum. Sensory areas of prosternum distinct. Meso- and metasternum weakly tectate longitudinally, the mesosternum with four somewhat enlarged tuberculiform mesosternals on each side; three similar tuberculiform nodes on metasternum (Fig. 27B). Mesopleurae weakly expanded posteriorly and both pleurae with a row of obtuse tubercles along the mid-line.

Abdomen. – Median segment roundly trapezoidal with anterior margin rounded. Segments II-VII very slightly gradually decreasing in length with II-II weakly narrowing and V.VII roughly uniform in width; IV 1.4x longer tan wide, VII subquadrate. All terga simply and densely granular. Sterna II and III with a fine medio-longitudinal carinae, the proceeding ones simple; all densely granular. Terga VII and IX somewhat wider than preceding and scarcely wider than long. Anal segment with lateral margins roundly deflexed and obtusely dentiform in anterior half (Fig. 27H); the posterior margin deeply indented medially and bi-lobate (Fig. 27F); ventral surface of posterior margin set with some black teeth. Epiproct very small, roundly triangular and concealed under anal segment. Vomer with basal portion triangular and with some transverse furrows, the apex distinctly arched towards the right by about 30° and forming a moderately long terminal hook. Poculum small, moderately bulgy, cup-shaped with a prominent median keel in posterior half, the surface otherwise weakly granulated; posterior margin entire, broadly rounded and slightly labiate (Fig. 27G); merely reaching on-third the way along anal segment.

Legs. – All coxae with a ventral spine at posterior margin, this small on pro- and mesocoxae but particularly distinct on metacoxae which bear another minute spiniform tubercle at the base. Profemora strongly compressed and arched in basal half; smooth dorsally and with 2-3 short spines in apical half of two outer ventral carinae. Posterodorsal carinae of meso- and metafemora with about three (mesofemora) to five (metafemora) small teeth in basal half; anterior carina unarmed. Medioventral carina of meso- and metafemora only indicated by a few small granules. Two exterior ventral carinae of mesofemora with 7-8 slender but pointed spines that gradually increase in size towards the apex of femur. Metafemora armed with 9-10 rather strong spines on two exterior ventral carinae, which gradually increase in size towards the apex; usually a smaller intercalated spine is present between the three apical spines. Protibiae wholly unarmed, meso- and metatibiae only with a few small denticulations ventrally. Tarsi stout and slightly less than half as long as corresponding tibiae; basitarsus somewhat longer than second joint.

Measurements [mm]. – Body 46.6, pronotum 3.3, mesonotum 9.0, metanotum 4.6, median segment 2.0, profemora 9.8, mesofemora 8.2, metafemora 10.7, protibiae 9.1, mesotibiae 7.5, metatibiae 9.8, antennae 33.0.

Remarks. – Females and eggs unknown.

Distribution. – Mindanao, Province South Cotabato (Mount Apo [RBINS]).

Eubulides igorrote Rehn & Rehn, 1939

(Fig. 28-30)

Eubulides igorrote Rehn & Rehn, 1939: 408, pl. 31: 4.

HT, ♂: Imugan, Nueva Viscaya, Luzon, Philippines (W. Boettcher); V.1912; *Eubulides igorrote* Rehn + Rehn, Type H.1292, Heard Cln; Data Base Serial No. assigned as Type No. September 2008, Type #9125 [ANSP]

- Otte, 1978: 79. (Type data)
- Zompro, 2004: 215.
- Otte & Brock, 2005: 136.
- Brock & Büscher, 2022: 521.

[**Not**: *Eubulides igorrote*, Zompro, 1996a: 161, figs, 2-6. Misidentification, here described as *Eubulides timog* **n. sp.**]

[**Not**: *Eubulides igorrote*, Sellick, 1998: 208. (Micropylar plate of egg). This relates to *E. timog* **n. sp.**]

[**Not**: *Eubulides igorrote*, Zompro, 2004: 209, figs. This is *E. timog* **n. sp.**]

[**Not**: *Eubulides igorrote*, Bollens & Krijns, 2010: 10, figs. (Notes on captive breeding. This is *E. timog* **n. sp.**]

[**Not**: *Eubulides igorrote*, Harman, 2015: 26. (Note on PSG culture stock). This relates to *E. timog* **n. sp.**]

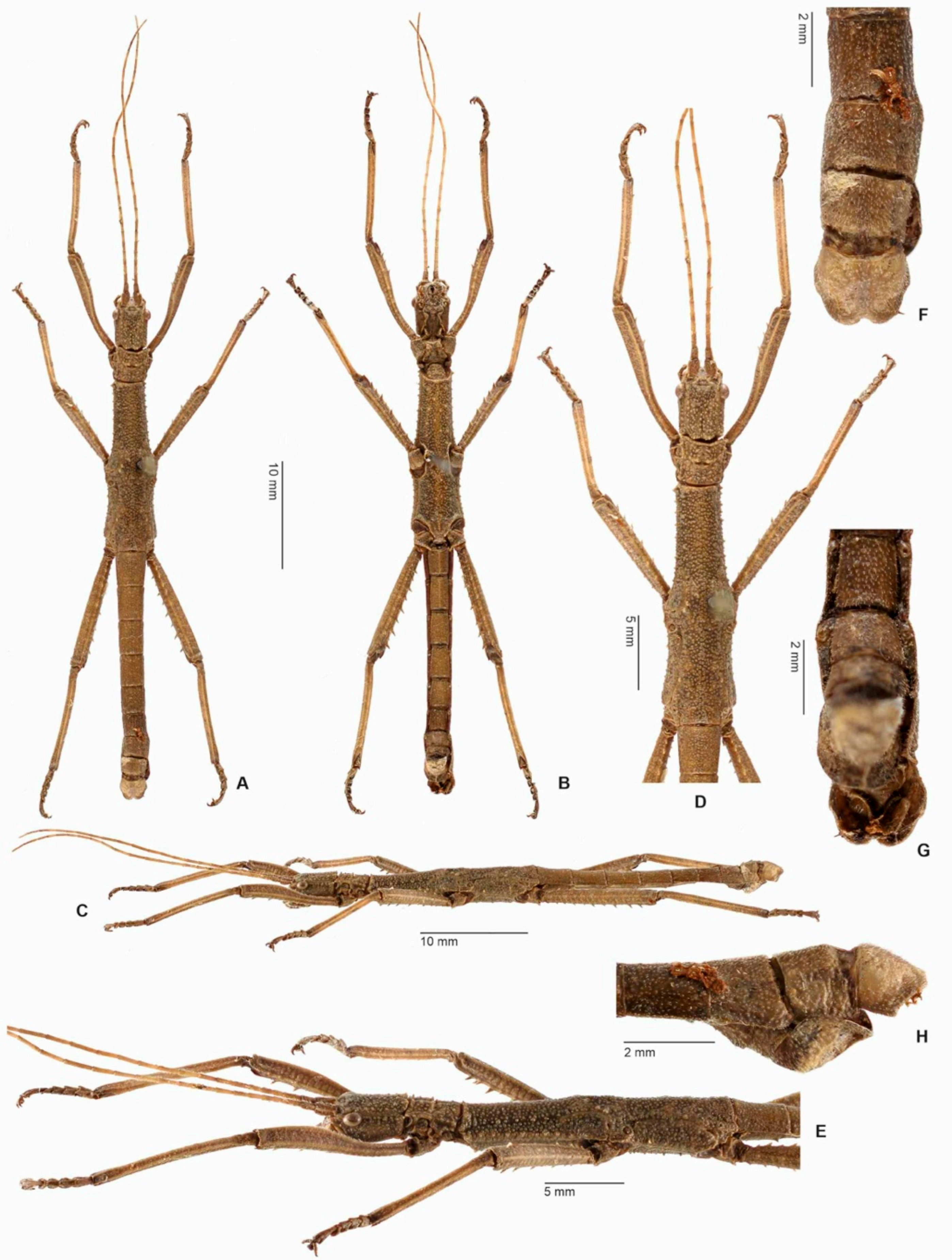

Fig. 27. *Eubulides constanti* **n. sp.** ♂ holotype [RBINS, © Jerome Constant].

– **A**. Habitus dorsal view. – **B**. Habitus ventral view. – **C**. Habitus lateral view. – **D**. Head and thorax in dorsal view. – **E**. Head and thorax in lateral view. – **F**. Terminalia in dorsal view. – **G**. Terminalia in ventral view. – **H**. Terminalia in lateral view.

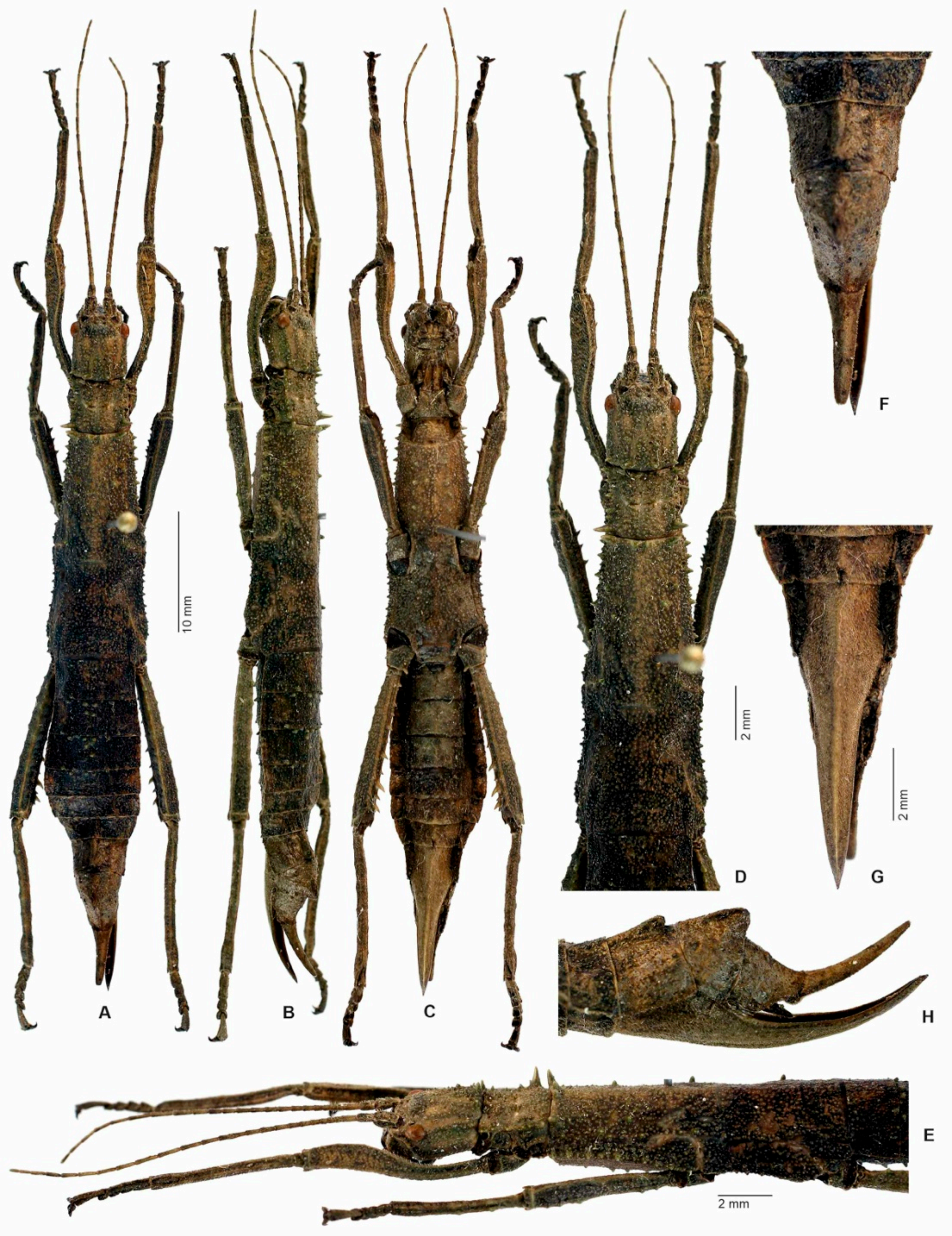

Fig. **28**. *Eubulides igorrote* Rehn & Rehn, 1939 ♀ N-Luzon, Mountain Province, Mount Polis, Sagada [RBINS, © J. Constant]. – **A**. Habitus dorsal view. – **B**. Habitus lateral view. – **C**. Habitus ventral view. – **D**. Head and thorax in dorsal view. – **E**. Head and thorax in lateral view. – **F**. Terminalia in dorsal view. – **G**. Terminalia in ventral view. – **H**. Terminalia in lateral view.

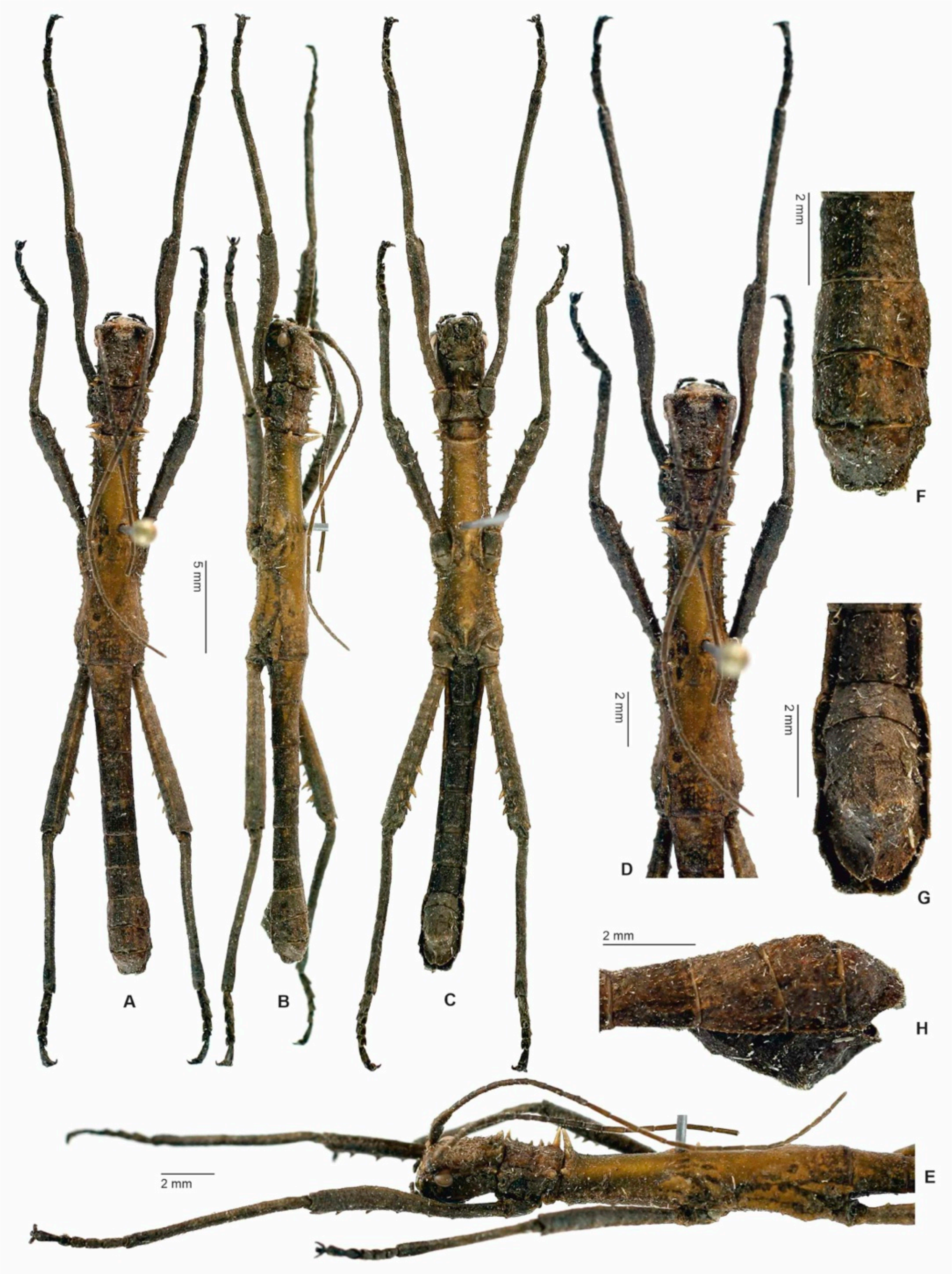

Fig. 29. *Eubulides igorrote* Rehn & Rehn, 1939 ♂ N-Luzon, Mountain Province, Mount Polis, Sagada [RBINS, © J. Constant]. – **A**. Habitus dorsal view. – **B**. Habitus lateral view. – **C**. Habitus ventral view. – **D**. Head and thorax in dorsal view. – **E**. Head and thorax in lateral view. – **F**. Terminalia in dorsal view. – **G**. Terminalia in ventral view. – **H**. Terminalia in lateral view.

Material examined

1 ♂: Philippinen, N Luzon Id., Central Cordillera Bontoc, Mountain Prov., lower Mount Polis, local collector 24.III.2012 [FH, No's 1129-1];

1 ♂: Philippinen, N Luzon Id., Province Ifuago, Kamandag, local collector III.2012 [FH, No's 1129-2];

1 ♀, 3 ♂, 1 ♀ (juvenile): Philippines, Luzon, Nueva Vizscaya, Leg T. Heitzmann & A. Kang 2013 [RBINS];

1 ♀, 1 ♂: Luzon, Mt. Prov., Sagada, Mt. Polis 2000m+, 16°57'40"N 121°1'18"E, Mossy for., 15.IV.2014, I.G. 32700, Mission Leopold III Funds, Constant J., Bresseel J. & co. [RBINS];

2 ♂: N Luzon, Mt. Prov., Cadaclan, Aug.2011, gift from B. Kneubühler, I.G. 32882 [RBINS].

Differentiation. – Both sexes of this small species are well recognised by the four strong anterior spines of the mesonotum, and distinct spines along the lateral margins of the pronotum, which includes a very strong postero-lateral spine. The ♀ resembles *E. timog* **n. sp.** from southern Luzon in general appearance but is notably smaller and stockier in shape and differs by the characteristic pro- and mesothoracic armature mentioned above. The eggs are characteristic for the distinct bristles of the operculum and short micropylar plate, which corresponds to only 70% of the dorsal capsule length and is basically roundly rectangular in outline with the two posterolateral extensions short and directed towards the capsule pole.

Description

A description of the previously unknown ♀ was provided by Acola *et al.* (2022: 3), but since the notably smaller specimens at hand from the collection of RBINS differ in some aspects, a description of these appears desirable. The colouration is described from dried examples and pictures of live specimens.

♀ (Fig. 28)

Form and colouration. – Small (body length 53.0-58.0 mm), form stocky for the genus with distinct and characteristic prothoracic and anterior mesothoracic armature; body surface all over densely granular and with scattered tubercles or short spines; granules smaller on abdomen although. Colour varying greyish to ochraceous mid brown and occasionally with some olive parts, the genae with a washed olive green postocular streak; the largest elements of armature dark green to olive. Eyes dark reddish brown. Antennae with some pale ochre colouration basally.

Head. – Subcylindrical, gradually widening towards the posterior and about 1.25x longer than wide with the vertex flattened; surface rough and granular (Fig. 28D-E). The median and lateral coronals well developed if compared to congenerics and obtusely spinose, some of the occipital medials small but spiniform; gulars very small. Eyes small slightly subcircular and less than half as long as gena, rather weakly projecting. Antennae with 26 joints and reaching to posterior margin of metanotum. Scapus flattened dorso-ventrally with interior margin somewhat rounded and narrowed at base, pedicellus shorter than scapus and tapering towards apex, III noticeably longer than IV and V, the median joints noticeably elongated.

Thorax. – Pronotum shorter but about equal in width to posterior portion of head, somewhat wider than long and gently constricted medially with the transverse median sulcus moderately impressed and weakly arched; surface unevenly tuberculose and granulose, the antero-laterals represented by short spines, the postero-laterals very prominent spines and the lateral margins with about four somewhat unequally sized but smaller lateral pronotal spines (Fig. 28D-E). Mesothorax 2.3x longer than prothorax and slightly gradually widening towards the posterior. Mesonotum almost rectangular about 2x longer than wide and with distinct anterior spines. Anterior mesonotals represented by distinct spines that are roughly equal in size to the postero-lateral pronotals (Fig. 28E); the anterior mesal mesonotals distinct but notably smaller; otherwise only with a small conical pair of pre-medians and posterior mesonotals as well as about four similarly sized tubercles along lateral margins. Metanotum slightly trapezoidal, about as wide as long with posterior margin concave and merely with a moderate pair of short, conical and simple posterior metanotals. Meso- and metasternum very weakly and obtusely tectate (Fig. 28C), the mesosternum with a row of five and the metasternum with 2-3 conical tuberculiform sternals. Mesopleurae moderately expanded towards the posterior and with a median longitudinal row of unevenly sized, short, conical spines; the metapleure only with conical tubercles.

Abdomen. – Median segment with anterior margin widely rounded and about 3x wider than long. Segments II-VII notably decreasing in length with VII scarcely more than half the length if II; II subrectangular, III-V notably widening and VI-VII distinctly narrowing; tergum V broadest and 4.2 wider than long. Terga III-V with five small anterior tubercles along anterior margin and a node-like pair of medial tubercles; VII weakly tectate longitudinally. Sterna II-V each with two pairs of obtusely spiniform tubercles; these only represented as nodes on VI and wanting on VII. Praeopercular organ a small and narrow median slit at posterior margin, that opens into a small rounded pit (Fig. 28G). Terga VIII and IX much narrower than preceding and all tectate longitudinally; VIII slightly wider than long and roughly rectangular in outline; VIII and IX with a on obtuse conical posterior swelling, which covers more than two-thirds of the length of tergum on IX (Fig. 28H). Anal segment narrowing towards a narrow but rounded posterior margin that merely has a very small and shallow median indention (Fig. 28F); the lateral margins straight anteriorly acutely angular medially and with a distinct concave excavation in posterior half (Fig. 28H). Cerci small, slender and flattened laterally. Epiproct about 1.6x longer than anal segment, up-curved, gradually narrowing towards a slender but blunt tip and weakly tectate medio-longitudinally (Fig. 28F, H). Subgenital plate elongate, lanceolate, navicular and up-curved (Fig. 28H) with the median keel distinct and becoming more acute towards the apex (Fig. 28G), the apex acutely pointed and just scarcely projecting beyond tip of epiproct.

Legs. – All coxae with a blunt ventral spine at posterior margin, this very small on pro- and mesocoxae but fairly distinct on metacoxae. Profemora strongly arched and prominently constricted in basal half; smooth dorsally and with three small teeth in apical half of two outer ventral carinae. Dorsal carinae of meso- and metafemora only with about four (mesofemora) to six (metafemora) very low and blunt teeth; the two basal ones more spiniform than the remaining ones. Medioventral carina of meso- and metafemora only indicated by a few small granules. Two exterior ventral carinae of mesofemora with 3-4 acute teeth in apical one-third of femur. Metafemora armed with 9-10 rather strong spines on two exterior ventral carinae, that gradually increase in size towards the apex; usually a smaller intercalated spine is present between the three prominent apical spines. Protibiae wholly unarmed, meso- and metatibiae only with a few small undulations dorsally and ventrally. Tarsi stout and almost half as long as corresponding tibiae; basitarsus somewhat longer than preceding joint.

Measurements [mm]. – Body 53.0-53.5, pronotum 4.0-4.1, mesonotum 11.8-12.0, metanotum 7.8-7.9, median segment 2.4-2.5, profemora 11.0-11.5, mesofemora 9.6-9.8, metafemora 11.9-12.0, protibiae 9.3-9.5, mesotibiae 7.9-8.0, metatibiae 11.3-11.5, antennae 23.0-24.0.

Variability. – The specimens recorded from Mount Palalai, Nueva Vizcaya Province by Acola *et al.* (2022) are notably larger than all other specimens at hand from the collection of RBINS and the authors collection. Body length ♂ 35.7-39.7 mm (RBINS, FH) *vs.* 44.0 mm (UPLB), ♀ 53.0-53.5 mm (RBINS) *vs.* 58.0 mm (UPLB). Moreover, the two UPLB specimens have the pro and mesothoracic armature notably less developed. The posterior pronotals in particular are only represented by short and rather obtuse spinose tubercles in the UPLB examples, whereas these are strong and acutely pointed spines in all other specimens.

Remarks. – The specimens from Mount Banahaw recorded as *E. igorrote* by Zompro (1996) were misidentified and represent *E. timog* **n. sp.** (see below). Thus, it is somewhat surprising that Acola *et al.* (2022: 3) state that "*Zompro's (1996) descriptions of both sexes including the egg agree to every part of characters*", although there are obvious morphological differences.

The ♂ available for examination allow a description of the terminalia, which are missing in the holotype specimen in the collection of ANSP. Although a brief characterization of the ♂ was provided by Acola *et al.* (2022: 3) are more detailed description of the terminalia shall be presented here. These may be described as follows: Terga VII-X slightly subuniform in length, VII and IX rectangular and subquadrate. Anal

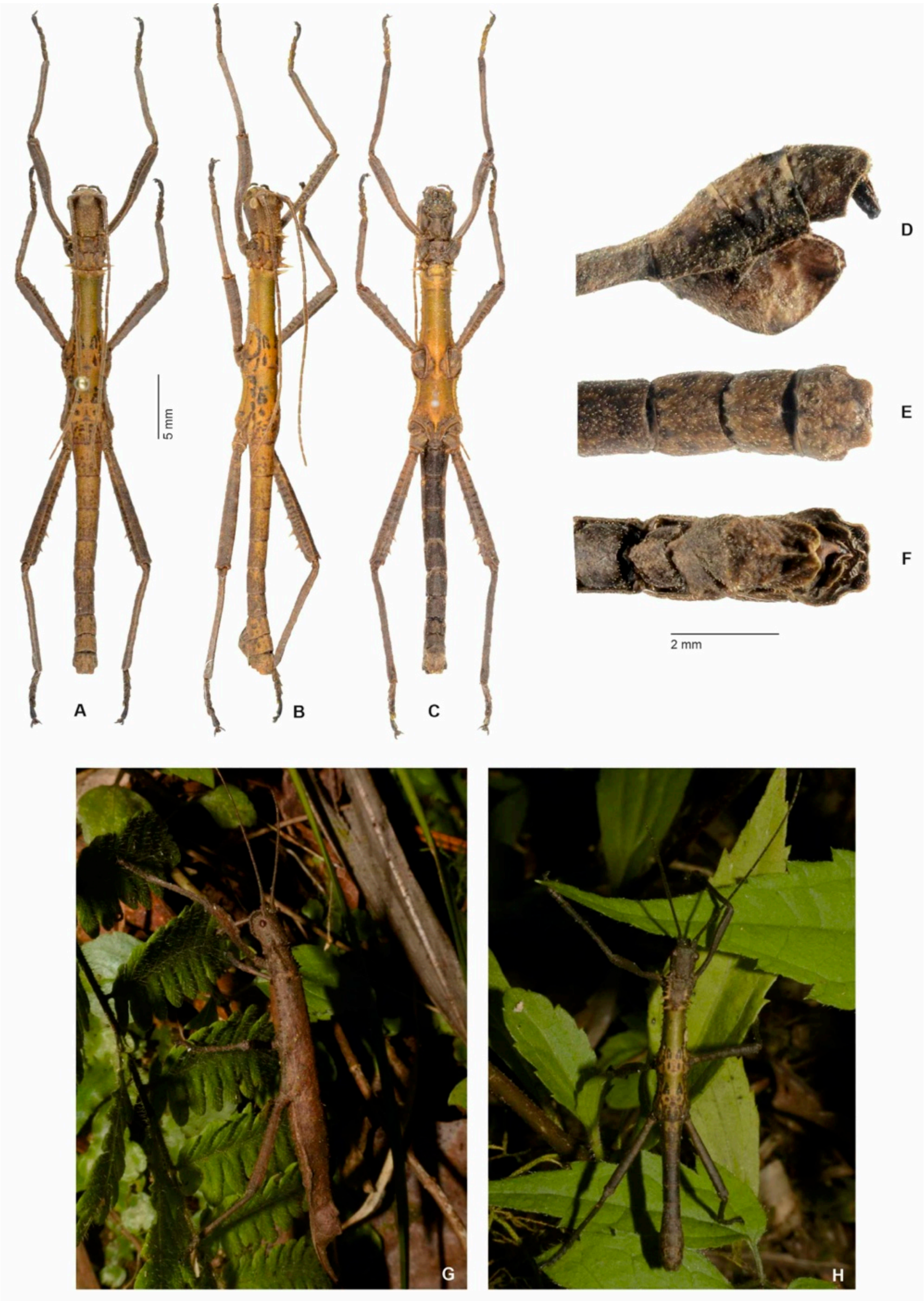

Fig. **30**. *Eubulides igorrote* Rehn & Rehn, 1939.

– **A**. ♂ dorsal view (N-Luzon, Ifuago Province, Kamandag) [FH 1129-2]. – **B**. ♂ dorsolateral view [FH 1129-2]. – **C**. ♂ ventral view [FH 1129-2]. – **D**. Terminalia of ♂ in lateral view (N-Luzon, Mountain Province, Bontoc, Mount Polis) [FH]. – **E**. Terminalia of ♂ in dorsal view [FH]. – **F**. Terminalia of ♂ in ventral view [FH]. – **G**. Live ♀ at N-Luzon, Ifuago Province, Banaue [© Albert Kang, https://www.inaturalist.org/observations/57614279]. – **H**. Live ♂ at N-Luzon, Ifuago Province, Banaue [© Albert Kang, https://www.inaturalist.org/observations/57609270].

segment with lateral margins notably deflexed and angular in basal half, the posterior half strongly narrowed (Fig. 30D); the posterior margin weakly concave medially (Fig. 29F, 30E) and the outer lateral angles somewhat inflated, obtusely rounded und minutely denticulated ventrally. Vomer with a rather small base and a long, digitiform and gently dextral-curved, acutely pointed terminal hook (Fig. 30F). Poculum fairly large- bowl-shaped and with posterior margin distinctly, triangularly indented medially and bilobed (Fig. 29G, 30F). While all dried specimens are brown in general colour, the ♂ photographed at Banaue, Ifuago by Albert Kang (Fig. 30H) shows an olive green meso- and metanotum with distinctive ochre and dark brown markings in the posterior portions. A description and illustration of the eggs was provided by Acola *et al.* (2002: 4, fig. 1A-B).

Distribution. – Luzon, endemic. Northern central Luzon, Province Nueva Vizcaya (Imugan [ANSP – type locality]; Mount Palali [UPLB]); Province Ifuago (Kamandag [FH]; Banaue [RBINS]); Mountain Province (Bontoc, Mount Polis [FH]; Sagada, Mount Polis 2000 m [RBINS]; Cadaclan [RBINS]).

***Eubulides lumawigi* n. sp.**

(Fig. 31-32)

ZooBank: https://zoobank.org/F40A284B-17B5-4613-A110-FA57107DAB44

HT, ♀: Coll. I.R.Sc.N.B., Philippines, N Luzon, Kalinga, Balbalaan, v. 2014, 17°27’N 121°09’E, Leg. I. Lumawig, gift from B. Kneubühler, I.G.: 32.613 [RBINS].

PT, **2** ♀, **1** ♂: Coll. I.R.Sc.N.B., Philippines, Ilocos Norte, Pagudpod, Kabigan Falls, IV.2014, leg. Heitzmann & Kang[RBINS].

PT, ♂: Philippinen, N Luzon Id., Ilocos Region, Provinz Ilocos Norte-Far, Pagudpod, local collector 08.IV.20012 [FH, No. 1457-1].

Differentiation. – This large species is recognised by the reduced body armature and the very long and slender ovipositor of ♀ (Fig. 31F-H). In aspect of the weakly developed body armature, it most closely resembles *E. blaan* **n. sp.** from the island of Mindanao but differs by lacking the distinct obtuse medio-longitudinal carina of the meso- and metanotum and having the keel on the ventral body surface much less distinct (Fig. 31C). Females may also be differentiated from those of *blaan* by having the mesonotum more distinctly narrowing towards the anterior (Fig. 31D, almost parallel-sided in *blaan*), less deflexed meso- and metapleurae, rounded posterior margin of the anal segment (Fig. 31F, distinctly indented in *blaan*), broader and more rounded pit of the praeopercular organ (Fig. 30G) and the distinct dentiform posteromedian protrusion of abdominal terga VIII and IX (Fig. 31H). Males have the mesonotum slightly longer (3.3x *vs*. 3.1x longer than prothorax in *blaan*), the mesosternals much less developed (Fig. 32C, three strong pairs in *blaan*), the spines on the ventral carinae of the meso- and metafemora somewhat less pronounced, the posterior margin of the anal segment distinctly bilobed (Fig. 32F, only with a small median indention in *blaan*), the poculum comparatively larger (Fig. 32H) and the vomer with a straight, much shorter and conical terminal point than in *blaan*.
From the very similar *E. timog* **n. sp.**, which however is restricted to the southern half of Luzon, it differs by the larger size and slenderer shape with relatively longer thoracic segments as well as the less distinct cephalic and thoracic armature. Females may also be differentiated by the rounded posterior margin of the anal segment (Fig. 31F, notably indented medially in *timog*) and much longer ovipositor, in which the epiproct is 2x longer than the anal segment (Fig. 31F-H, notably less than than 2x in *timog*). Males can be separated from those of *timog* by the relatively slenderer limbs with the hind legs projecting considerably beyond the apex of the abdomen, more distinct medio-longitudinal bulge of the meso- and metasternum (Fig. 32C), narrower and distinctly bilobed posterior margin of the anal segment (Fig. 32F) and very strong, conical and straight terminal point of the vomer (much slenderer and noticeably arched in *timog*).

Etymology. – Named after Ismael O. Lumawig (Bulacan, Luzon, Philippines), the collector of the holotype of this new species in appreciation of his efforts and continuous help in obtaining specimens over many years.

Description

A large, slender and plain species with the body subuniform in width, the body surface densely granulose but lacking any enlarged tubercles or even spines the legs relatively slender and elongate. Thorax with dorsal and ventral side weakly tectate medio-longitudinally. The colouration is described from dried specimens only. Unfortunately, all five specimens at hand have the tips of the antennae broken off, thus the exact number of antennomeres is unknown.

♀ (Fig. 31)

Form and colouration. – Large (body length 76.5.0-85.5 mm), slender and body fairly uniform in diameter; body surface very densely granular, the abdominal terga carinated longitudinally; ovipositor long and slender. Meso- and metanotum obtusely tectate longitudinally. Colour varying from ochraceous to greyish light or mid brown; fairly plain in all examined specimens but the two paratypes from Kabigan Falls darkened due to preservation. Granulations of the thoracic segments dark straw-coloured in the holotype. Eyes orangey brown. Antennae somewhat lighter in colour than body.

Head. – Subcylindrical, weakly widening towards the posterior and only 1.2x longer than width at posterior margin with the vertex flattened; surface rough and granular, the median and lateral coronals moderately developed and obtusely spinose and with a short longitudinal furrow between the lateral and median coronals; gulars very small (Fig. 31D). Eyes small, just moderately projecting and slightly subcircular, length of eye contained 2.6x in length of gena. Antennae projecting over anterior margin of mesonotum. Scapus subrectangular, flattened dorso-ventrally with interior margin noticeably rounded; pedicellus scarcely shorter than scapus and tapering towards apex, III noticeably longer than IV and V; the median joint fairly elongated.

Thorax. – Pronotum equal in width but slightly shorter than head, scarcely longer than wide and rectangular in outline with the transverse median sulcus shallow and weakly arched; surface unevenly tuberculose and granulose but the tubercles along the lateral margins somewhat more pronounced, the anterior mesal pair of tubercles conical and only the antero-laterals represented as short spines (Fig. 31D-E). Mesothorax just slightly gradually widening towards the posterior (Fig. 31D). Mesonotum about 3.5x longer than wide and parallel-sided with the anterior mesals and antero-laterals represented by small conical tubercles; metanotum rectangular and about 1.25x longer than wide; both with a distinct but obtuse medio-longitudinal bulge. Sensory areas of prosternum large and oval. Meso- and metasternum also with an obtuse but rather shallow medio-longitudinally bulge that is covered with some glossy granules and terminates in a warty swelling pre-posteriorly; mesosternum with a row of six strong tuberculiform mesosternals on each side and metasternum with two pairs of small tubercles. Mesopleurae weakly expanded, meso- and metapleurae both distinctly granular and with numerous small but unevenly sized tubercles along the mid-line, the three anterior ones of the mesopleurae somewhat more pronounced than the remaining.

Abdomen. – Median segment trapezoidal with anterior margin weakly rounded and about 1.8x wider than long. Segments II-IV slightly subuniform in width and slightly decreasing in length, all transverse; V-X gradually narrowing. Terga V-IX with a pair of roughly parallel, closely spaced medio-longitudinal carinae and two less distinct lateral carinae on each side, all of which become increasingly pronounced towards IX. Sterna II-VI each with four moderate tubercles that are arranged in a quadrate and a further notably smaller pair of median tubercles; II-IV with an obtuse medio-longitudinal keel. Praeopercular on sternum VII formed by a distinct and deeply impressed pear-shaped median excavation (Fig. 31G). Terga VIII and IX with the two medio-dorsal carinae converging posteriorly to form a distinct, obtusely triangular protuberance (very prominent and irregularly shaped on IX, Fig. 31H). Anal segment weakly tectate and narrowing towards a broadly rounded

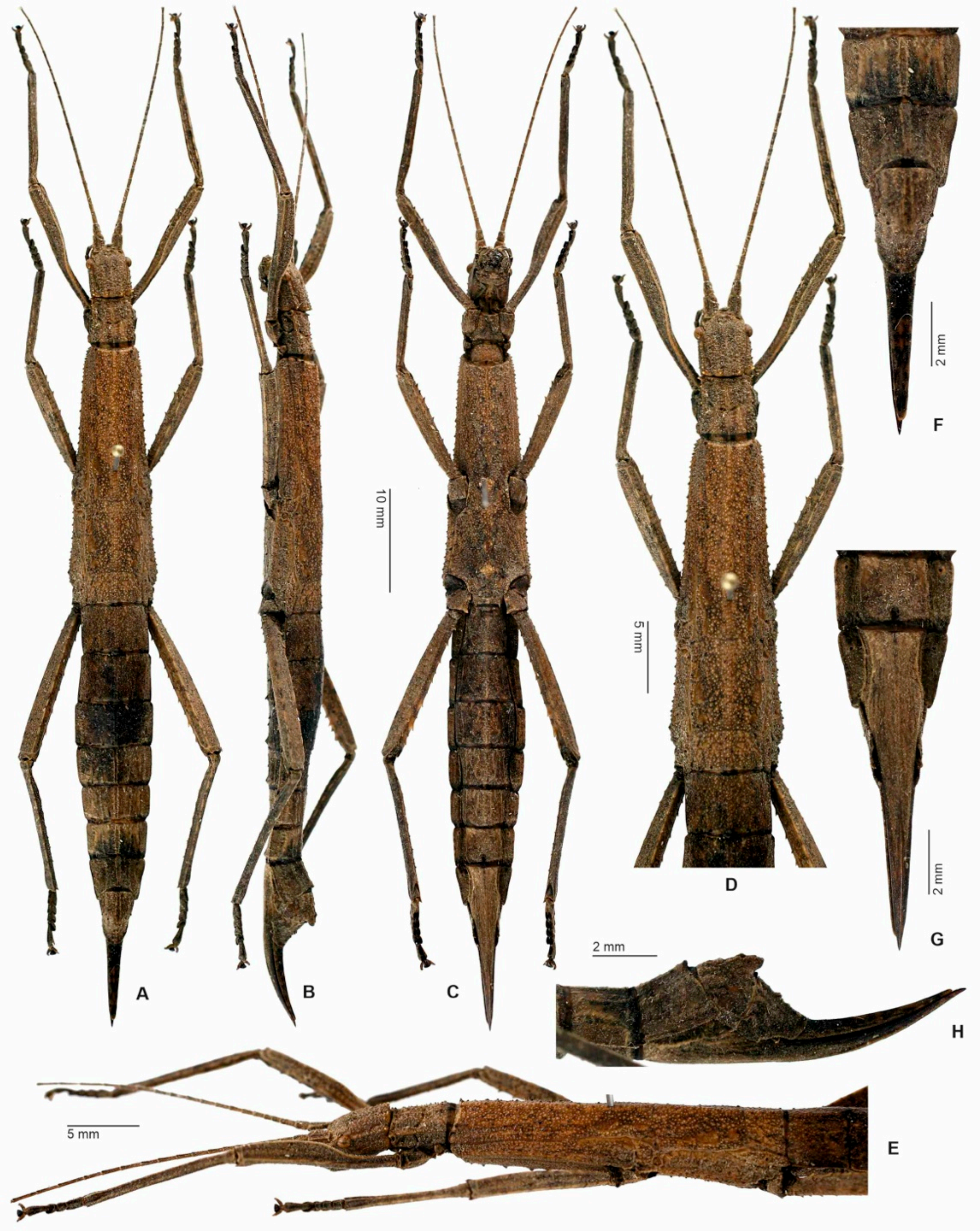

Fig. 31. *Eubulides lumawigi* **n. sp.** ♀ holotype [RBINS, © Jerome Constant].
– **A**. Habitus dorsal view. – **B**. Habitus lateral view. – **C**. Habitus ventral view. – **D**. Head and thorax in dorsal view. – **E**. Head and thorax in lateral view. – **F**. Terminalia in dorsal view. – **G**. Terminalia in ventral view. – **H**. Terminalia in lateral view.

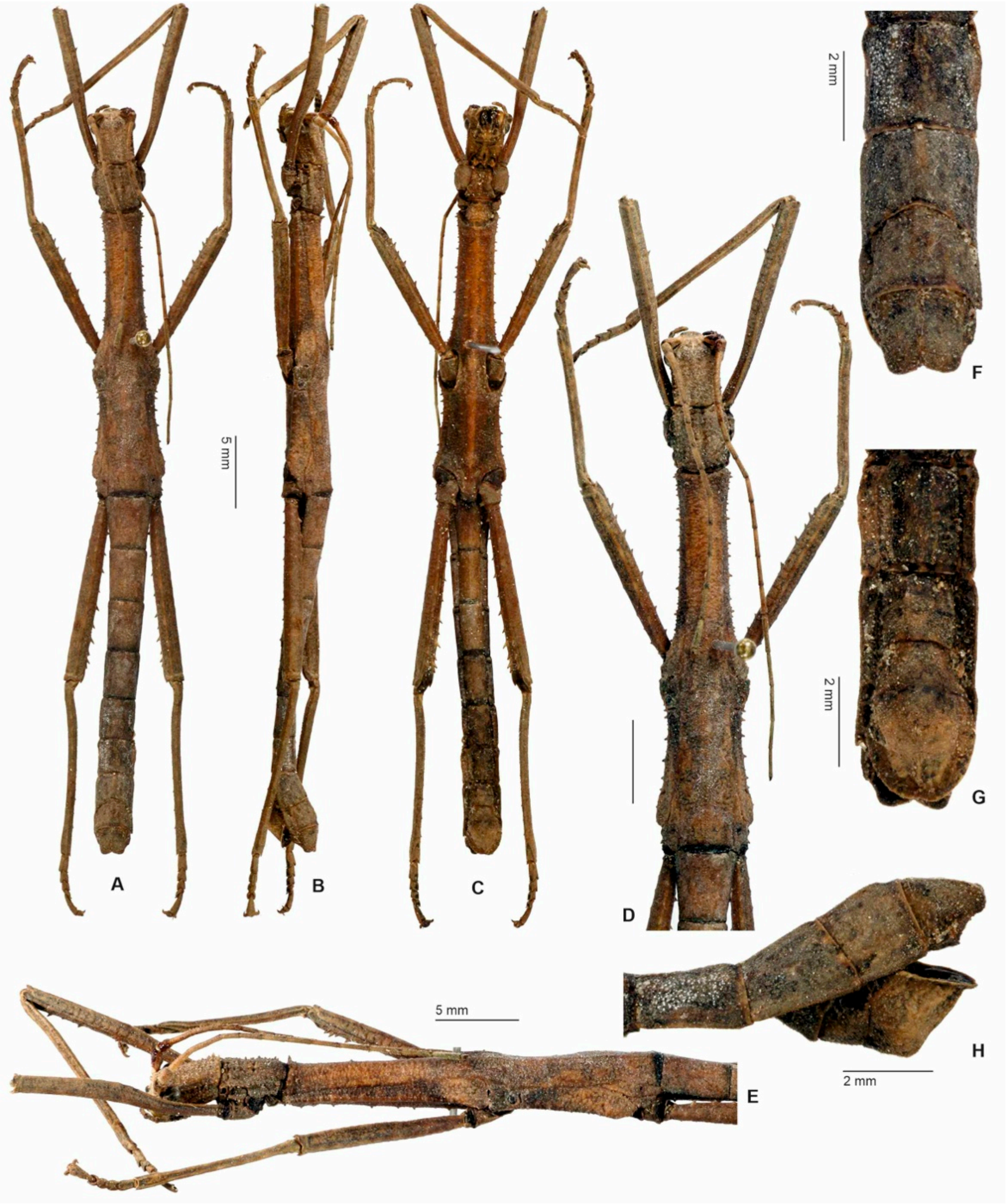

Fig. **32**. *Eubulides lumawigi* **n**. **sp**. ♂ paratype [RBINS, © Jerome Constant].

– **A**. Habitus dorsal view. – **B**. Habitus lateral view. – **C**. Habitus ventral view. – **D**. Head and thorax in dorsal view. – **E**. Head and thorax in lateral view. – **F**. Terminalia in dorsal view. – **G**. Terminalia in ventral view. – **H**. Terminalia in lateral view.

posterior margin (Fig. 31F); medially with a pair of small, conical tubercles (Fig. 31H); the lateral margins straight anteriorly acutely angular medially and with a distinct concave excavation in posterior half (Fig. 31H). Cerci very small, almost wholly concealed under anal segment and distinctly flattened laterally. Epiproct almost 2.5x longer than anal segment, up-curved, gradually narrowing towards a narrow but blunt tip and weakly tectate medio-longitudinally (Fig. 31F). Subgenital plate elongate, lanceolate, navicular and up-curved (Fig. 31H) with the median keel particularly distinct and becoming much more acute in the apical one-third and towards the apex (Fig. 31G), the apex acutely pointed and somewhat projecting beyond tip of epiproct.

Legs. – All coxae with an obtuse ventral spine at posterior margin, this small on pro- and mesocoxae but distinct on metacoxae which bear another minute spiniform tubercle at the base. Profemora smooth dorsally and with three small but acute teeth in apical half of two outer ventral carinae. Dorsal carinae of meso- and metafemora only with 3-5minute teeth in basal portion, otherwise unarmed; the medioventral carina of meso- and metafemora only indicated by a few small granules. Two exterior ventral carinae of mesofemora with 8-9 small but acute teeth that slightly increase in size towards the apex of femur. Metafemora armed with 10-12 moderate acute teeth on two exterior ventral carinae, which gradually increase in size towards the apex; usually a smaller intercalated tooth present between the three apical ones. Protibiae wholly unarmed, meso- and metatibiae only with a few some weakly indicated dentations ventrally. Tarsi notably less than half the length of corresponding tibiae; basitarsus somewhat longer than preceding joint.

♂ (Fig. 32)

Form and colouration. – Large for the genus (body length 58.4-59.0mm), form rather slender with the posterior portions of meso- and metathorax not notably inflated. Body surface densely but more minutely granular than in ♀ but the tubercules on head, pronotum, anterior margin of mesonotum as well as the meso- and metapleurae notably more pronounced and partly spiniform. Colour much as in ♀ and uniform but the medio-longitudinal bulge of meso- and metasternum of a slight orangey hue.

Head. – Basically, as in ♀ but the whole surface more distinctly tubercular and the four coronals and gulars relatively more developed and conical, the coronals rather spiniform (Fig. 32D-E). Eyes relatively larger and more prominently projecting than in ♀, length corresponding to 0.55x the length of gena. Antennae at least reaching to posterior margin of median segment, as in ♀.

Thorax. – Pronotum basically as in ♀ but slightly more narrowed medially and more elongate in shape, being 1.3x longer than wide; entire surface much more tuberculose than in ♀ with two rows of rather developed medials, of which the two pairs closest to the transverse median furrow are slightly spiniform (Fig. 32D-E). Mesothorax slender, 3.3x longer than prothorax and about 4.8x longer than width in median portion, slightly widened at anterior margin and in posterior portion with the median section uniform in diameter. Meso- and metanotum slightly gradually narrowing towards the posterior, surface granular and with a few very low scattered tubercles, particularly along the lateral margins; the anterior mesal and antero-lateral mesonotals more developed than in ♀ and represented by short but rather strong conical spines. Metanotum subrectangular and weakly narrowed medially, about 2.1x longer than wide and without notably enlarged tubercles. Meso- and metapleurae with a medio-longitudinal row of obtuse variably sized tubercles, the largest of which are slightly spinose; these less pronounced on metapleurae; the antero-lateral tubercle of mesopleurae spiniform (Fig. 32D). Meso- and metasternum with a low and obtuse medio-longitudinal bulge, that is set with a few glossy granules; mesosternum with four and metasternum with three pairs of small tubercles (Fig. 32C).

Abdomen. – Median segment rectangular with anterior margin somewhat tectate. Segments II slightly trapezoidal, III-VI roughly uniform in width; II-VII gradually and notably decreasing in length; II-VI on average 1.4x longer than wide, VII roughly quadrate in outline. Terga II-VIII unarmed, VIII and IX with an obtuse medio-longitudinal bulge. Sterna as in ♀ but the four paired tubercles less distinct and II-IV with the medio-longitudinal carina more fine and acute; IX transverse. Anal segment with a fine but acute medio-longitudinal carina dorsally; the lateral margins notably deflexed and angular in basal portion, then concave in lateral aspect (Fig. 32H); the posterior portion of segment much narrowed and distinctly bilobed with a fairly deep, triangular median excavation (Fig. 32F); the outer ventral angles minutely denticulate ventrally. Epiproct very small, roundly triangular and wholly concealed under anal segment. Cerci small, somewhat tapering towards an obtuse tip, distinctly compressed laterally and carinated dorsally and ventrally. Vomer with basal portion inflated laterally and impressed medio-basally; the terminal point very strong, conical, somewhat displaced to the left and rather straight. Poculum bulgy with a distinct median keel in posterior half, the surface otherwise weakly granular; posterior margin and with a medially indented, broad and weakly bi-labiate flange (Fig. 32G).

Legs. – Relatively longer and slightly slenderer than in ♀; coxae as in ♀. Armature of limbs generally as in ♀ but the ventral spines of the meso- and metafemora somewhat slenderer but longer and more spinose than in ♀.

Variability. – No considerable variability is seen in the five specimens at hand, other than size variation and slight chromatic differences in ♀, which however appear to be mostly caused by the preservation.

Remarks. – Eggs unknown.

Distribution. – N-Luzon: Province Kalinga (Balbalaan [RBINS]); Province Ilocos Norte (Pagudpod [FH]; Pagudpod, Kabigan Falls [RBINS]).

	♀, **HT** [RBINS]	♂, **PT**	♀, **PT**
Body	76.5	58.4-59.0	78.0-85.5
Pronotum	4.8	3.9	5.0-5.5
Mesonotum	15.2	13.5-13.8	16.1-16.8
Metanotum	6.5	6.1-6.2	7.4-7.9
Median segment	3.1	2.7-2.8	3.4-3.5
Profemora	13.7	12.3-13.2	16.8-16.0
Mesofemora	11.2	11.1-11.2	13.1-13.5
Metafemora	15.5	14.1-14.3	16.5-18.7
Protibiae	12.5	12.3-12.9	14.0-16.8
Mesotibiae	9.9	9.8-9.9	11.2-12.7
Metatibia	15.4	14.2-14.6	16.2-19.0
Antennae	> 26.0	> 25.0	> 35.0

Table 3. Measurements of *Eubulides lumawigi* **n. sp.**

Eubulides taylori Rehn & Rehn, 1939
(Fig. 33)

Eubulides igorrote Rehn & Rehn, 1939: 410, pl. 31: 12, 2 10.

HT, ♀: Polillo Taylor; *Eubulides taylori* Rehn + Rehn, Type H. 1251, Heard Cln; Data Base Serial No. assigned as Type No. September 2008, Type #9124 [ANSP];

PT, ♂: Polillo Is. P. I. (Taylor); 16744; Allotype *Eubulides taylori* Rehn + Rehn, Paratype, Hebard Cln; Data Base Serial No. assigned as Type No. September 2008, Type #9124 [ANSP];

PT, ♂: Polillo Taylor; 16744; USNM; *Eubalides taylori* Rehn & Rehn Paratype [USNM].

- Otte, 1978: 79. (Type data)
- Zompro, 2004: 209.
- Otte & Brock, 2005: 136.
- Baker, 2015: 3. (Pest status)
- Brock & Büscher, 2022: 521.

[**Not**: *Eubulides taylori*, Acola et al., 2022: 4, fig. 2. Misidentification, see comment below]

Differentiation. – This is the largest member of the genus and very closely resembles the type-species *E. alutaceus* Stål, 1877 from the island of Luzon, with which it shares the general smoothness of the body, stocky overall shape, notably inflated posterior portion of the meso- and metathorax (♂ in particular) and strongly incrassated meso- and metafemora of both sexes. Both sexes however are separable by the less pronounced tubercles at the anterior margin of the pronotum and wanting mesal pair of pronotal tubercles. Females may also be separated by the large posteromedian protuberance of abdominal terga VIII and IX (Fig. 33E) and minutely dentate dorsal carinae of the meso- and metafemora (Fig. 33B).

Remarks. – With the exception that *E. taylori* is notably larger than the three known examples of *E. alutaceus* the morphological differences are so insignificant that the availability of more specimens from throughout South Luzon and the island of Polillo may well show that *taylori* is merely a geographic variant of Stål's species and thus a synonym.

Although also from the island of Polillo, the specimens recorded and illustrated by Acola *et al.* (2022: 4) from the collection of UPLB are apparently misidentified and do not represent *E. taylori*.

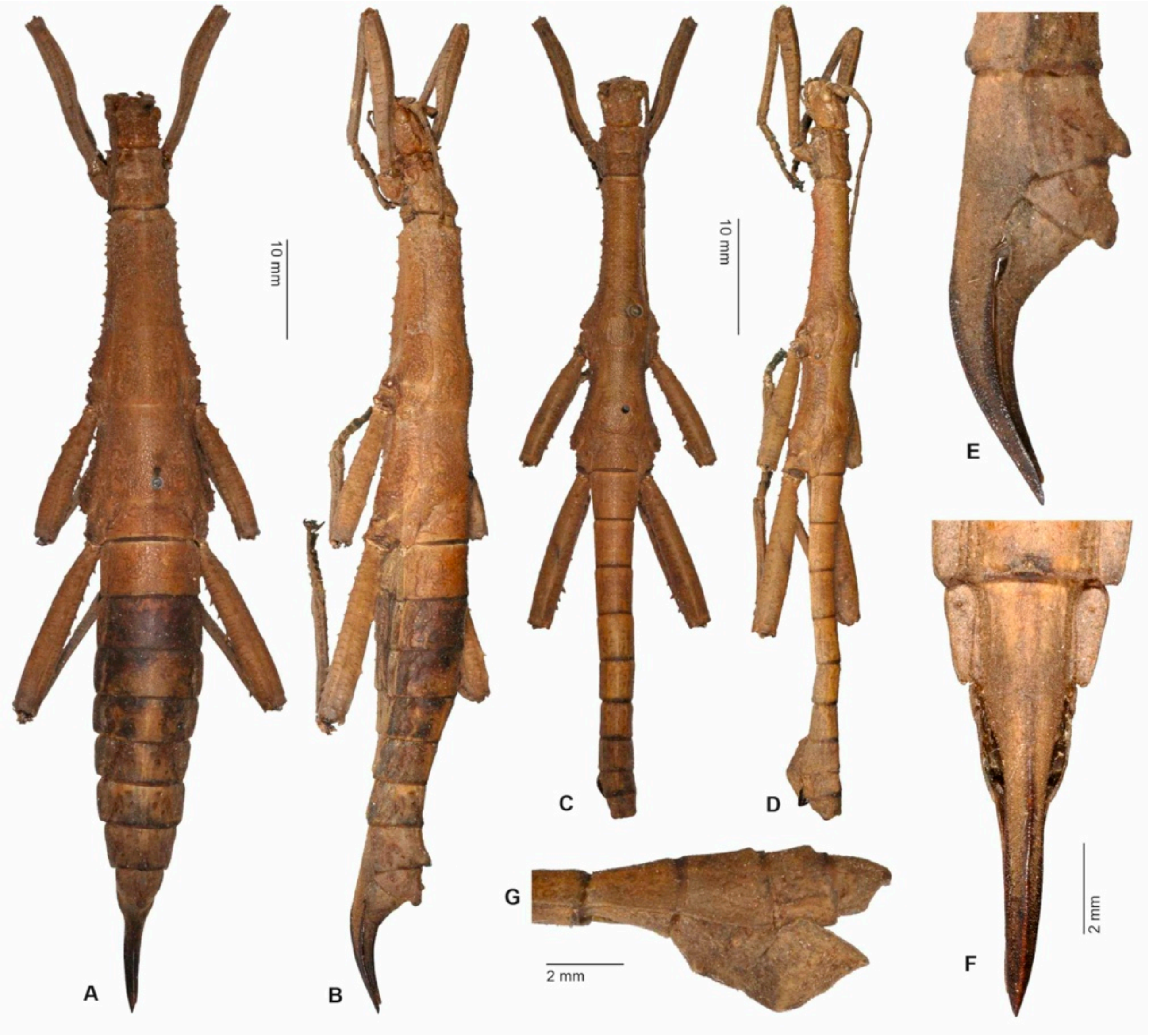

Fig. 33. *Eubulides taylori* Rehn & Rehn, 1939.
– **A**. ♀ holotype, dorsal view [ANSP]. – **B**. ♀ holotype, dorsolateral view [ANSP]. – **C**. ♂ allotype, dorsal view [ANSP]. – **D**. ♂ allotype, dorsolateral view [ANSP]. – **E**. Terminalia of ♀ holotype, lateral view [ANSP]. – **F**. Terminalia of ♀ holotype, ventral view [ANSP]. – **G**. Terminalia of ♂ allotype, lateral view [ANSP].

Both sexes differ considerably from the type specimens by their smaller size (♀ 68.65-79.25 mm, ♂ 55.75-57.40 mm), slenderer shape, relatively longer body segments, not posteriorly inflated meso- and metathorax as well as the much slenderer and relatively longer and more delicate limbs. The femora are strongly incrassated and considerably broader than the corresponding tibiae in *taylori* and ♂ of this species in particular are also characteristic for having the posterior portion of the meso- and metathorax distinctly swollen or inflated (less pronounced in ♀). Moreover, ♂ of *taylori* have the tubercles of the mesopleurae much less developed. In ♀ of *taylori* abdominal segments II-VII are almost 2.5x wider than long, whereas they are rather subquadrate in the UPLM examples. The specimens recorded by Acola *et al*. (2022) much more resemble *E. lumawigi* **n. sp.** and *E. timog* **n. sp.** from Luzon in general shape, but without detailed examination their true identity must remain unsolved for now. It is likely that they represent another as yet undescribed species. Body length of the type-specimens of *taylori* according to Rehn & Rehn (1939: 410): ♀ holotype 92.0 mm, ♂ allotype 62.5 mm.

Distribution. – Polillo Island, endemic.

Eubulides timog n. sp.

(Fig. 34-37, 72F & 73J-K)

ZooBank: https://zoobank.org/48E4B721-4E72-4EB0-A3BD-A1E68EAE5066

Eubulides igorrote, Zompro, 1996a: 161, figs. 2-6. (Misidentifucation)

- Sellick, 1998: 208. (Micropylar plate of egg)
- Zompro, 2004: 209, figs.
- Bollens & Krijns, 2010: 10, figs. (Notes on captive breeding)
- Harman, 2015: 26. (Note on PSG culture stock).
- Hennemann et al., 2016: figs. 36, 37, 51a-b.
- Bank et al., 2021: 15, figs. 6, 7.

HT, ♀: Philippines, Luzon, Quezon Prov., Marinfanta road km 95, 14.56811N 121.49129E, 10.IV.2011, I.G.: 31.905 [RBINS].

PT, ♀, **2** ♂: Philippines, Luzon, Quezon Prov., Marinfanta road km 95, 14.56811N 121.49129E, 10.IV.2011, I.G.: 31.905 [RBINS].

PT, ♂: Philipines, E. Luzon, Quirino, Sierra Madre, IV.2010, leg I. Lumawig, gift from B. Kneubühler, I.G.32.613 [RBINS].

PT, ♂: Philippines, Luzon, QNP, Pinagbanderahan, Atimonan, 14°02'N121°45'E, 12.IV.2011; I.G.: 31.905 [RBINS].

PT, **2** ♀: Philippines, Luzon, Quezon prov., Real, Mt. Palakong, 14.65797°N121.58247E, 11.IV.2011, I.G.: 31.905 [RBINS].

PT, ♀: Philippines, Luzon, Brgy Kinabuhayan, Dolores, Christalina falls, Mt. Banahaw, 14°14'12"N121°28'48"E, 14.IV.2011; I.G.: 31.905 [RBINS].

PT, **1** ♀, **1** ♂, **1** ♂ (penultimate instar): Philippinen, S Luzon Id., Bicol Region, Provinz Albay, Mount Mayon, local collector I-II.2011 [FH, No's 0685-23 to 25].

PT, ♂: Philippinen, S Luzon Id., Bicol Region, Provinz Sorsogon, Mount Bulusan, local collector IX.2002 [FH, No. 0685-26].

PT, ♀: Philippinen, S Luzon Id., Bicol Region, Provinz Albay, Tiwi Municipality, local collector I.2011 [FH, No. 0685-27]

PT, **1** ♀, **1** ♂: ex Zucht Rabaey & Simoens 2010, Herkunft: Philippinen, Luzon Id., Quezon NP, leg. Th. Heitzmann 08 [FH, No's 0685-1 & 2].

PT, **1** ♀, **1** ♂: ex Zucht Rabaey & Simoens 2010, Herkunft: Philippinen, Luzon Id., Quezon NP, leg. Bresseel et al. 08 [FH, No's 0685-3 & 4].

PT, **2** ♂, **30** eggs: ex Zucht F. Hennemann 2010, Herkunft: Philippinen, Luzon Id., Quezon NP, leg. Bresseel et al. 08 [FH, No. 0685-5, 6 & E1].

PT, **16** ♀, **20** eggs: ex Zucht F. Hennemann 2019-2020 (parthen.), Herkunft: Philippinen, Luzon Id., Quezon NP, leg. Bresseel et al. 08 [FH, No's 0685-7 to 22, E2].

PT, **1** ♀, **1**, ♂, **1** ♀ (juvenile): Philippinen, Prov. Leyte, S-Leyte Island, Mahaplag, lowland, local collector VI.2012 [FH, No's 0685-29 to 31].

Differentiation. – Most closely resembling the other large Luzonese *E. lumawigi* **n. sp.**, which however is restricted to northern Luzon. This new species however differs by the smaller size and stockier shape with the thoracic segments relatively shorter as well as the more pronounced cephalic and thoracic armature. Females can also be separated by the medially excavated posterior margin of the anal segment (Fig. 35F, rounded in *lumawigi*) and shorter, less elongate ovipositor, in which the epiproct is no more than 1.8x longer than the anal segment (Fig. 35E-F, 2x longer in *lumawigi*). Males may be distinguished from those of *lumawigi* by the relatively stockier and shorter limbs with the metatibiae hardly reaching to the apex of the abdomen (Fig. 34E-G, L-N), less distinct medio-longitudinal bulge of the meso- and metasternum (Fig. 35D), hexagonal anal segment that has the posterior margin just shallowly emarginated (Fig. 35J), distinctly bilobed and triangularly excavated medially in *lumawigi*) and slenderer, distinctly arched terminal hook of the vomer (Fig. 72F, a rather straight on strong, conical point in *lumawigi*).

From *E. alutaceus* Stål, 1875, the second species that occurs in southern Luzon, this new species is easily separated by much slenderer shape and slenderer limbs that have the femora not notably inflated as in *alutaceus*. Males lack the distinctly inflated posterior portions of the meso- and metathorax and red lateral surfaces of the mesothorax seen in *alutaceus*, have the cephalic and thoracic armature much more developed (Fig. 35C) and have the poculum considerably smaller (Fig. 35H, reaching to tip of abdomen in *alutaceus*), the anal segment not distinctly bilobed posteriorly (Fig. 35J) and the epiproct much smaller and almost wholly concealed under the anal segment (Fig. 35K, projecting and bilobed in *alutaceus*). Females of *timog* **n. sp.** can readily be distinguished by having the mesothorax not as notably widening towards the posterior and trapezoidal in outline as in *alutaceus*, the abdominal segments II-VII not as distinctly transverse and the cephalic and prothoracic armature much more developed (Fig. 35A).

Etymology. – The name (*timog* Filipino = south, southern) refers to the northern distribution of this new species, which is only known from the southern portion of Luzon. Neuter.

Description

A moderately sized species with the general form rather slender with body subuniform in width, the body surface densely granulose but just sparsely tuberculate; the legs relatively slender and elongate. Thorax with dorsal and ventral side weakly tectate medio-longitudinally. The colouration is described from dried specimens and pictures of live specimens.

♀ (Fig. 34A-D & H-K)

Form and colouration. – Medium sized (body length 64.0-76.0 mm), rather slender and body fairly uniform in diameter. Colour varying from light to mid grey, buff and ochre over various tones of drab and brown to almost black, either uniform or with some irregular dark lateral markings on abdominal terga II-IV and VIII, with faint dark longitudinal streaks on dorsal body surface or all over flecked with different colours; tergum V occasionally with a cream-coloured triangular medio-anterior marking and tergum IV quite frequently darker than rest of body (or a more detailed summary of chromatic variability see below). Genae often with a faint dark postocular streak. Antennae usually of lighter colour than body and ranging from straw-coloured to pale ochre.

Head. – Subcylindrical, slightly widened posteriorly and about 1.25x longer than wide with the vertex flattened; surface rough and granular, the median and lateral coronals moderately developed and obtusely spinose and in front of median coronals with a row of small supra-orbitals; gulars very small (Fig. 35A). Eyes slightly subcircular and their length contained 2.4x in length of genae. Antennae with 25 joints and reaching to anterior of median segment. Scapus flattened dorso-ventrally with interior margin noticeably

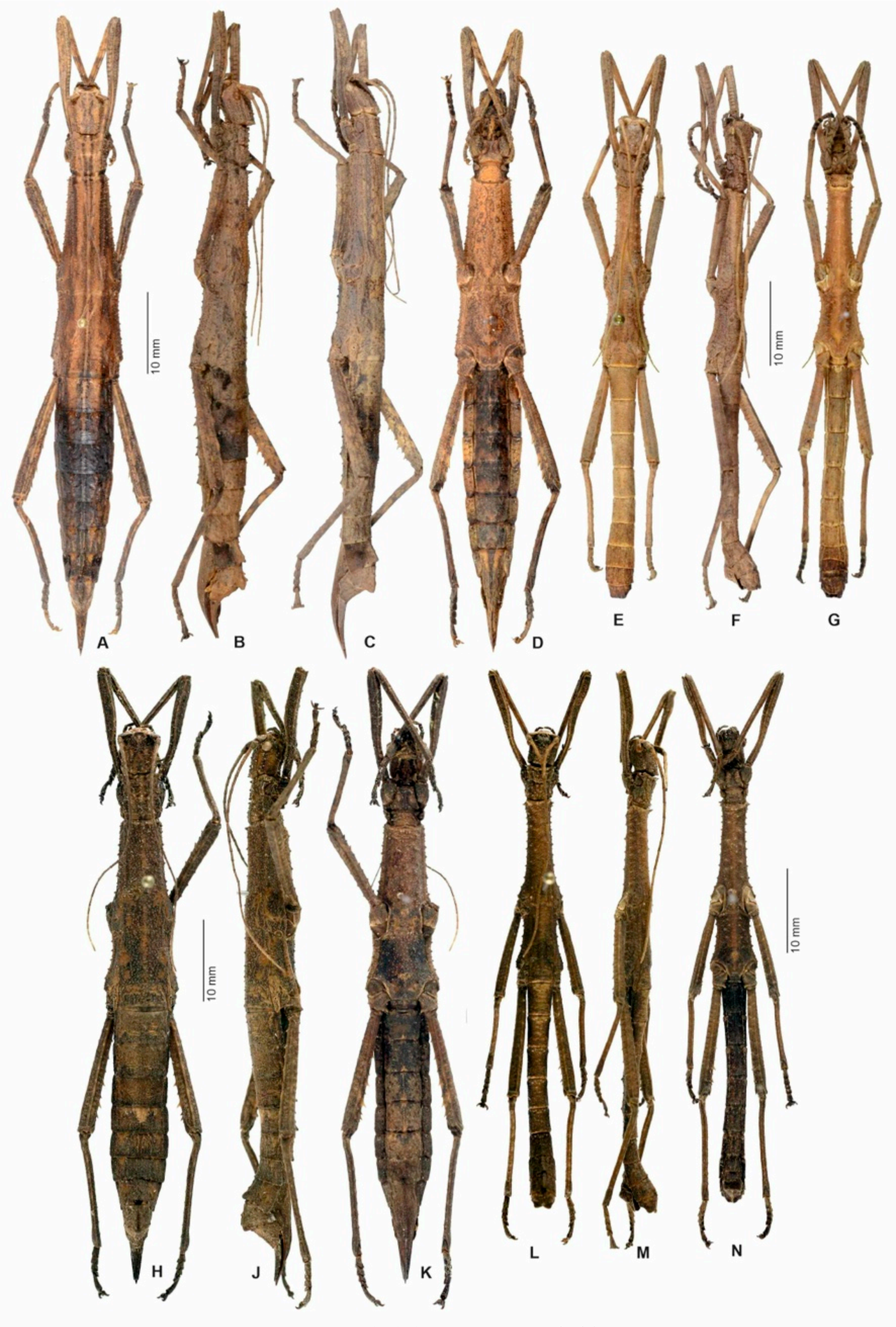

Fig. **34**. *Eubulides timog* **n**. **sp**. habitus.

– **A**. ♀ paratype, dorsal view (S-Luzon, Bicol, Albay Province, Mount Mayon) [FH 0685-23]. – **B**. ♀ paratype, lateral view (S-Luzon, Bicol, Albay Province, Tiwi) [FH 0685-27]. – **C**. ♀ paratype, lateral view (reared from Quezon N.P., S-Luzon) [FH 0685-1]. – **D**. ♀ paratype, ventral view (S-Luzon, Bicol, Albay Province, Mount Mayon) [FH 0685-23]. – **E**. ♂ paratype, dorsal view (reared from Quezon N.P., S-Luzon) [FH 0685-4]. – **F**. ♂ paratype, lateral view (reared from Quezon N.P., S-Luzon) [FH 0685-5]. – **G**. ♂ paratype, ventral view (reared from Quezon N.P., Luzon) [FH 0685-4]. – **H**. ♀ holotype, dorsal view (S-Luzon, Quezon Province, Marinfanta road) [RBINS]. – **J**. ♀ holotype, lateral view (S-Luzon, Quezon Province, Marinfanta road) [RBINS]. – **K**. ♀ holotype, ventral view (S-Luzon, Quezon Province, Marinfanta road) [RBINS]. – **L**. ♂ paratype, dorsal view (S-Luzon, Quezon Province, Marinfanta road) [RBINS]. – **M**. ♂ paratype, dorsal view (S-Luzon, Quezon Province, Marinfanta road) [RBINS]. – **N**. ♂ paratype, dorsal view (S-Luzon, Quezon Province, Marinfanta road) [RBINS].

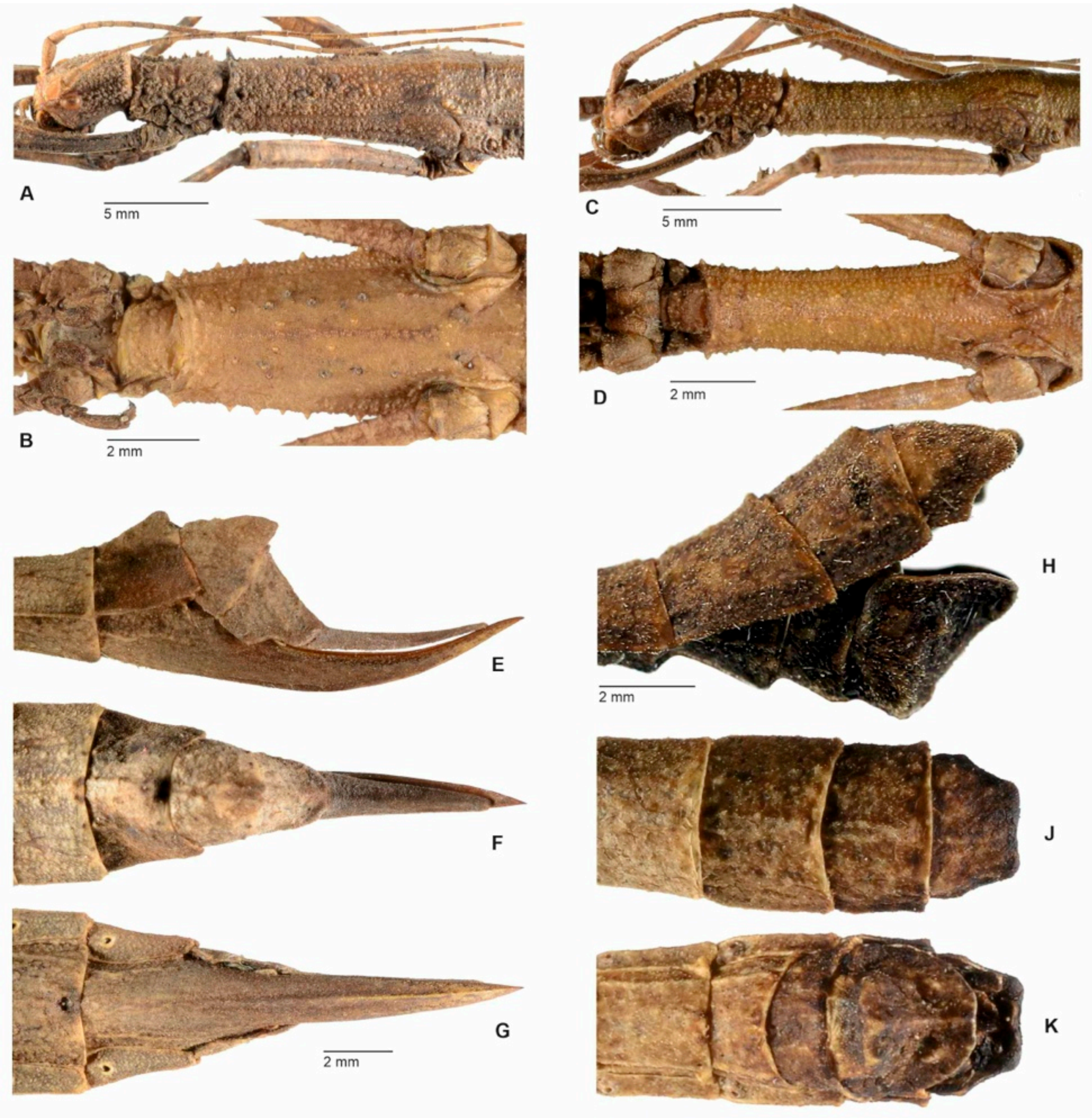

Fig. **35**. *Eubulides timog* **n**. **sp**.

– **A**. ♀ paratype, head, pro- and mesothorax lateral view [FH]. – **B**. ♀ paratype, head, pro- and mesosternum ventral view [FH]. – **C**. ♂ paratype, head, pro- and mesothorax lateral view [FH]. – **D**. ♂ paratype, head, pro- and mesosternum ventral view [FH]. – **E**. ♀ paratype, terminalia lateral view [FH]. – **F**. ♀ paratype, terminalia dorsal view [FH]. – **G**. ♀ paratype, terminalia ventral view [FH]. – **H**. ♂ paratype, terminalia lateral view [FH]. – **J**. ♂ paratype, terminalia dorsal view [FH]. – **K**. ♂ paratype, terminalia ventral view [FH].

rounded, pedicellus scarcely shorter than scapus and tapering towards apex, III noticeably longer than IV and V.

Thorax. – Pronotum equal in length and width to head and gently constricted medially with the transverse median sulcus deeply impressed and distinctly arched; surface unevenly tuberculose and granulose and with two rows of medial tubercles. Antero-mesal pronotals small, the antero-laterals somewhat more pronounced. A medium-sized pair of obtuse posterior mesal pronotal tubercles present just in front of median sulcus and a slightly smaller pair just behind it. Lateral margins with small but fairly acute lateral tubercles and the postero-lateral pronotals rather distinct on spiniform (Fig. 35A). Anterior mesonotals variable in size, the mesal ones noticeably smaller and the lateral ones moderately distinct to prominent and spinose; occasionally a few pre-medial and median mesonotal tubercles present (e. g. specimen from Tiwi, Albay Province). Mesonotum about 2.75x longer than wide and rectangular. Metanotum slightly trapezoidal and somewhat longer than wide. Meso- and metasternum with an obtuse medio-longitudinally keel that is covered with some glossy granules; mesosternum with about four and metasternum occasionally with two pairs of low conical tubercles. Mesopleurae rather weakly expanded and both pleurae with numerous variably sized tubercles along the mid-line, the three anterior-most of the mesopleurae more or less conical or occasionally subspiniform (Fig. 35B).

Abdomen. – Median segment with anterior margin weakly rounded and about 1.8x wider than long. Segments II-IV roughly uniform in width, V-X gradually narrowing; II and III equal in length, IV-VII slightly decreasing in length and becoming increasingly transverse: V-IX with a pair of roughly parallel, closely spaced carinae, which become increasingly pronounced towards IX. Sterna II-IV with a fine medio-longitudinal carina and four small tubercles that are arranged in a quadrate. Praeopercular on sternum VII formed by a distinct, heart-shaped median pit, the posterior margin only with a minute indention medially (Fig. 35G). Terga VIII and IX with the two medio-dorsal carinae converging posteriorly and forming a distinct, obtusely triangular protuberance (very prominent on IX, Fig. 35E). Anal segment weakly tectate and narrowing towards an angular and with the posterior margin weakly excavated medially (Fig. 35F); the lateral margins straight anteriorly acutely angular medially and with a distinct concave excavation in posterior half (Fig. 35E). Cerci small and distinctly flattened laterally. Epiproct almost 2x longer than anal segment, up-curved, gradually narrowing towards a slender but blunt tip (Fig. 35F) and weakly tectate medio-longitudinally. Subgenital plate elongate, lanceolate, navicular and up-curved (Fig. 35E) with the median keel distinct and becoming more acute towards the apex, the apex acutely pointed and slightly projecting beyond tip of epiproct.

Legs. – All coxae with a ventral spine at posterior margin, this small on pro- and mesocoxae but particularly distinct on metacoxae which bear another minute spiniform tubercle at the base. Profemora smooth dorsally and with three low and rather blunt teeth in apical half of two outer ventral carinae. Dorsal carinae of meso- and metafemora with about five (mesofemora) to seven (metafemora) teeth; these much more pronounced with the three basal ones rather spiniform on metafemora. Medioventral carina of meso- and metafemora only indicated by a few small granules. Two exterior ventral carinae of mesofemora with 7-9 spiniform teeth that gradually increase in size towards the apex of femur. Metafemora armed with 9-10 rather strong spines on two exterior ventral carinae, which gradually increase in size towards the apex; usually a smaller intercalated spine is present between the three apical spines. Protibiae wholly unarmed, meso- and metatibiae only with a few small denticulations ventrally. Tarsi stout and about half as long as corresponding tibiae; basitarsus somewhat longer than preceding joints.

♂ (Fig. 34E-G, L-N)

Form and colouration. – Moderately sized for the genus (body length 49.5-54.2 mm), form rather slender with the posterior portions of meso- and metathorax not notably inflated. Body surface more distinctly granular than in ♀. Colour much as in ♀ but on average of slightly darker tones and uniform; lateral surfaces of thorax may be slightly darker than dorsum. Mesonotum usually of lighter colour than rest of body and orangey to russet.

Head. – Basically, as in ♀ but the four coronals and gulars relatively more developed and conical (Fig. 35C). Antennae reaching to abdominal segment II.

Thorax. – Pronotum basically as in ♀ but slightly narrowing towards posterior and therefore trapezoidal in outline (Fig. 35C). Mesothorax much more narrowed in the anterior three-quarters with the anterior margin slightly widened, the mesonotum almost 4.6x longer than width at anterior margin. Mesonotum granular and unevenly tuberculated with the tubercles roughly arranged in two longitudinal lateral rows; the anterior mesal and antero-lateral mesonotals as in ♀. Metanotum subrectangular and narrowed medially, without notably enlarged tubercles. Meso- and metapleurae with a medio-longitudinal row of obtuse variably sized tubercles, the largest of which are slightly spinose; these less pronounced on metapleurae; the antero-lateral tubercle of mesopleurae spiniform. Meso- and metasternum with a weakly indicated, obtuse medio-longitudinal keel, that is set with some glossy granules; mesosternum with four pairs of slightly enlarged tubercles (Fig. 35D), metasternum with 2-3 pairs of small tubercles.

Abdomen. – Median segment roundly trapezoidal with anterior margin rounded. Segments II very slightly trapezoidal, III-VI roughly uniform in width, VII weakly trapezoidal; II and IV equal in length, V-VI slightly decreasing in length; on average about 1.4x longer than wide. Terga II-VIII unarmed, VIII and IX with two roughly parallel longitudinal carinae. Sterna as in ♀ but the four paired tubercles very indistinct and only II-III with a fine medio-longitudinal carina; IX transverse. Anal segment hexagonal in dorsal aspect (Fig. 35J), wider than long, the lateral margins somewhat deflexed and angular (Fig. 35H); the posterior margin roundly angular and gently concave, the outer ventral angles minutely dentate. Epiproct very small, triangular and concealed under anal segment. Cerci small, somewhat tapering towards an obtuse tip and slightly compressed laterally. Vomer with basal portion inflated laterally and impressed medially; the strong terminal hook fairly long and arched dextrally by about 45° (Fig. 72F). Poculum moderately bulgy and angular in centre (Fig. 35H) with a distinct median keel in posterior half, the surface otherwise weakly tuberculated; posterior margin with a medially indented, bi-labiate flange (Fig. 35K).

Legs. – Coxae as in ♀. Armature of limbs generally as in ♀ but the ventral spines of the meso- and metafemora somewhat smaller than in ♀.

Variability. – There is only slight variability but mostly in ♀, which morphologically vary in the number and development of the pro- and mesonotal tubercles and posteromedian protrusion of abdominal terga VIII and IX. The colouration varies considerably in ♀ but is much less variable in ♂. While ♂ range from plain buff, drab (e. g. Fig. 37D) and ochre to mid brown and may have the median portion of the mesonotum dark yellow or orangey (Fig. 37A) or have a pale posterior marking on the meso- and metapleurae, ♀ show wide array of different colour patterns, some of the variations which are shown in figures 36-37. The general colour ranges from light grey (Fig. 36E), buff and ochre (Fig. 36A) over various tones of drab and brown and also includes specimens that show a slight greenish wash (Fig. 37E), orangey hie (Fig. 36B) or ones that are prettily flecked with blackish brown and pale cream (Fig. 37B). Occasionally, there is an arched white lateral stripe along the metathorax and basal abdominal terga (Fig. 36B) or a russet medio-longitudinal stripe on the abdominal terga (Fig. 36E) and quite frequently abdominal tergum is darker in colour than the rest of the body and/or tergum V shows a variable degree of whitish or cream-coloured patterns (e. g. Fig. 37D, E). The ♀ from Mount Mayon (Fig. 34A) has the dorsal body surface with three faint darker brown longitudinal streaks and some specimens have the largest of the mesonotal tubercles marked by dark brown spots. A few specimens have abdominal terga IV and V darker in colour than all other terga and there is a faint cream-coloured triangular marking at anterior margin of tergum V in one of the

	♀, **HT** [RBINS]	♂, **PT**	♀, **PT**
Body	75.4	49.5-54.2	64.0-76.0
Pronotum	7.9	3.5-3.7	4.3-4.9
Mesonotum	5.1	10.9-12.8	13.0-14.4
Metanotum	15.6	5.8-6.3	6.0-7.5
Median segment	7.2	2.1-2.3	2.4-2.8
Profemora	3.3	9.3-10.7	11.9-13.7
Mesofemora	15.0	8.1-9.0	9.8-10.7
Metafemora	12.6	10.2-11.6	13.0-15.0
Protibiae	16.4	9.6-11.4	11.4-12.0
Mesotibiae	11.4	7.0-8-8	9.5-9.9
Metatibia	10.8	9.8-11.7	14.3-15.2
Antennae	-	26.5-30.0	32.0-36.0

Table 4. Measurements of *Eubulides timog* **n. sp**.

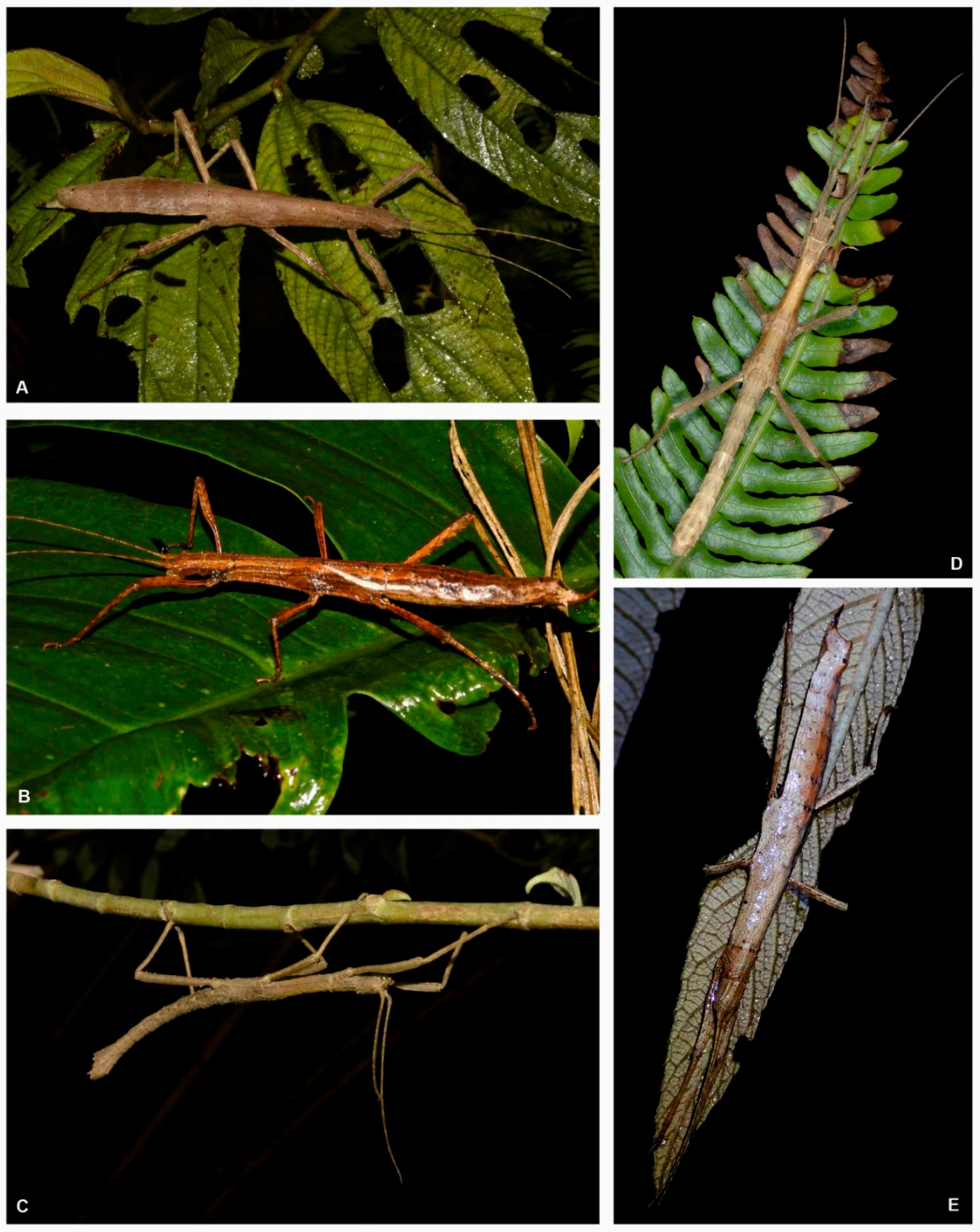

Fig. **36**. *Eubulides timog* **n**. **sp**. live insects all © Albert Kang.

– **A**. ♀ plain greyish brown form at Real, Quezon N.P., S-Luzon [https://www.inaturalist.org/observations/57609540]. – **B**. Reddish brown ♀ with faint dark stripes at Real, Quezon N.P., S-Luzon [https://www.inaturalist.org/observations/61372561]. – **C**. ♂ at Real, Quezon N.P., S-Luzon [https://www.inaturalist.org/observations/57614167]. – **D**. Captive reared ♂ from S-Luzon, Bicol, Quezon N.P. – **E**. Light cream-coloured ♀ with a red-brown streak on abdomen at Real, Quezon N.P., S-Luzon [https://www.inaturalist.org/observations/50772133].

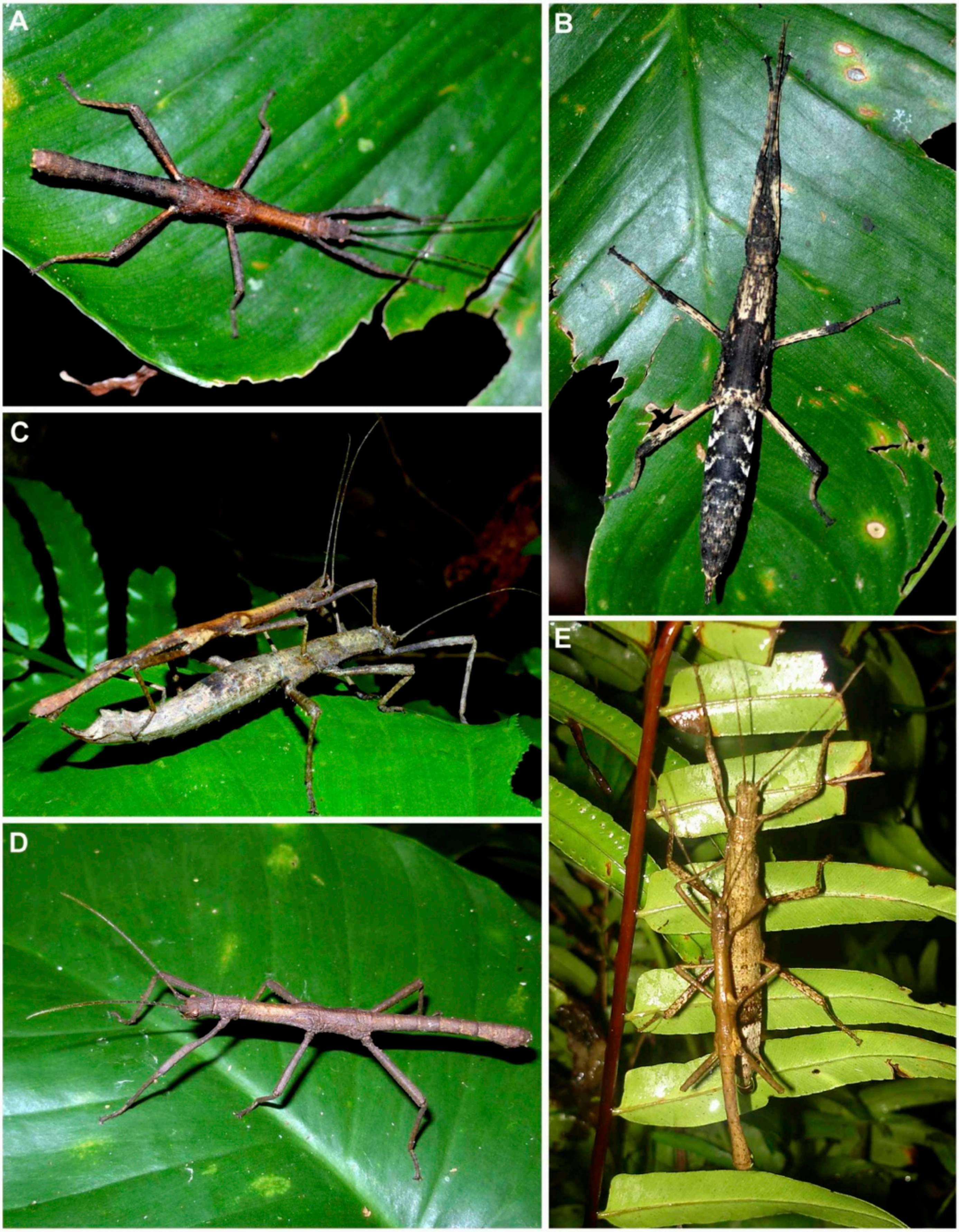

Fig. **37**. *Eubulides timog* **n**. **sp**. live insects all © Joachim Bresseel.

– **A**. Brown ♂ with orangey mesothorax at type-locality Marinfanta Road, Quezon Province, S-Luzon. – **B**. Black and white flecked ♀ at type-locality Marinfanta Road, Quezon Province, S-Luzon. – **C**. Couple at Quezon National Park, S-Luzon. – **D**. Plain greyish brown ♂ at Quezon National Park, S-Luzon. – **E**. Couple at E-General Nakar, Quezon Province, S-Luzon with ♀ showing light greyish abdominal terga IV-VI and the ♂ with a yellowish posterior marking on meso- and metapleurae.

captive reared examples, a ♀ from Marinfanta road, Quezon Province in RBINS (Fig. 34H) and the ♀ from Leyte in the authors collection. The example from Tiwi, Albay Province has a velvety blackish lateral marking on abdominal terga I-IV and VIII.

Egg (Fig. 73J-K)

Elongate, slightly bullet-shaped, weakly oval in cross-section with polar end slightly narrowing; 2.6x longer than wide and 2.3x longer than high. Entire surface of capsule densely pitted and somewhat rugulose anteriorly and posteriorly; the anterior margin with a slight bulge and a row of somewhat enlarged impressions. Polar-area very weakly conical in centre. Micropylar plate large and about 0.7x the length of capsule; essentially shape roundly rectangular with a large and deep triangular posteromedian indention with the outer angles forming two narrowing and slightly laterally directed extensions; surface like capsule and outer margin with a narrow bulge. Micropylar cup fairly distinct, bowl-shaped and with an obtuse swelling anteriorly. Median line a prominent raised bulge, which posteriorly slightly surpasses the micropylar plate. Operculum elliptical and very weakly convex; surface densely setose. Opercular angle *ca.* 15°. Colour plain dark brownish grey, the operculum slightly darker. Measurements [mm]: Length 5.3, width 1.9, height 2.2, length of micropylar plate 3.8.

Remarks. – Specimens of this new species were first recorded by Zompro (1996a: 161) as *Eubulides igorrote* Rehn & Rehn, 1939, who described and illustrated both sexes and the egg. Based on this misidentification the culture stock collected by J. Bresseel and T. Heitzmann in the Quezon Province, South Luzon in 2009 and subsequently included on the Phasmid Study Group (PSG) culture list as culture no. 311 was also misidentified as *E. igorrote* Rehn & Rehn, 1939 (Bresseel & Krijns, 2010; Harman, 2015: 26). The culture is since being reared in captivity in Europe but has meanwhile become parthenogenetic. The species is easy to rear in humid conditions and accepts various alternative food plants, which include bramble and raspberry (*Rubus* spp., Rosaceae), roses (*Rosa* spp., Rosaceae), hazel (*Corylus avellana*, Betulaceae), oak (*Quercus robur*, Fagaceae) and salal (*Gaultheria shallon*, Ericaceae). Earlier generations mostly fed on various Araceae, including *Epipremnum*-species and *Syngonium*-species. Krijns (2011: 20) also reported this species to be almost exceptionally found on different Araceae.

Distribution. – S-Luzon, Bicol Region: Province Quezon (Mount Banahao, Alitao River, 600 m [OZ]; Marinfanta road km 95 [RBINS]; Real, Mount Palakong [RBINS]; Quezon National Park, Pinagbanderahan, Atimonan [RBINS]; Mount Banahaw, Christalina Falls [RBINS]); Province Albay (Mount Bulusan [FH]; Mount Mayon [FH]; Tiwi [FH]). E-Luzon: Province Quirino (Sierra Madre [RBINS]). Leyte: Province Leyte (Mahaplag [FH]).

Genus ***Mearnsiana*** Rehn & Rehn, 1939

Differentiation. – This genus comprises the most colourful of all representatives of Obriminae (Fig. 39). While the reduced body armature places *Mearnsiana* in what Hennemann *et al.* (2016) referred to as the *Theramenes*-group, molecular data place the genus in close relation to *Aretaon* Rehn & Rehn, 1939, a genus that is restricted to Borneo and Palawan. *Mearnsiana* differs from *Theramenes* and *Eubulides* by the straight, not up-curved ♀ ovipositor (Fig. 38N) and prominent compound posterior mesonotals and metanotals of ♂ (Fig. 38E, 40D). From *Aretaon* the genus readily differs by the much stockier general shape and relatively shorter body segments, just weakly curved and almost not compressed base of the profemora as well the basically bright green colouration of both sexes. Females also differ by the laterally expanded mesothorax (Fig. 38A), weakly developed thoracic armature and much reduced posterior meso- and metanotals (Fig. 38B) as well as the wholly unarmed abdominal terga (Fig. 38B). Males can also readily be separated from those of *Aretaon* by the much longer antennae, which roughly equal in length to the body, reduced cephalic spination and very large, bulgy poculum. The eggs are less elongated and bulgier than those of *Aretaon* and have a H-shaped micropylar plate with four lateral extensions (Fig. 73L-M).

Remarks. – This monotypic genus was originally described from a juvenile ♀ in a very early stage of development. Since in this genus immatures look very different from adult insects in being various shades of grey and brown in colour and are so much stockier than adults with all the armature considerably more pronounced, this has resulted in the description of a synonymic genus, which emphasizes the problems that are involved in the unfortunate fact that Rehn & Rehn (1939) described many of their new taxa from immature insects. Hennemann *et al.* (2016: 18) have therefore synonymised *Hennobrimus* Conle, 2006 with *Mearnsiana*, because the type-species merely represent fully-grown specimens of *Mearnsiana*. This is the same case with a species that was described by Lit & Eusebio (2005), which is synonymised with *M. bullosa* below. There appears to be a second still undescribed species on Mount Redondo, Dinagat Island north of Mindanao (Bank *et al.,* 2021). The numerous citations of *Eubulides* may be referred to in the Phasmida Species File (http://Phasmida.SpeciesFile.org).

Distribution. – Philippines, endemic. So far recorded from the islands of Mindanao and Leyte.

Species included

1. ***Mearnsiana bullosa*** Rehn & Rehn, 1939: 459, pl. 38: 47.
Distribution: Mindanao & Leyte.

2. ***Mearnsiana maranao*** **n. sp.**
Distribution: Mindanao.

Mearnsiana bullosa Rehn & Rehn, 1939
(Fig. 38-39, 71N & 73L-M)

Mearnsiana bullosa Rehn & Rehn, 1939: 459, pl. 38: 47.
HT, ♀ (juvenile): Mindanao Mt Apo PI; June-July EAMearns; USNM; Type No. 53318 U.S.N.M.; *Mearnsiana bullosa* Rehn + Rehn, Type [USNM].
- Zompro, 2004: 204, fig.
- Otte & Brock, 2005: 195.
- Bollens, Krijns & Bresseel, 2010: 23.
- Harman, 2015: 27.
- Hennemann et al., 2016: 110.
- Brock & Büscher, 2022: 521.

= *Hennobrimus hennemanni* Conle, 2006: 45, figs.1-6.
HT, ♂: Philippines, Mindanao, 08.2004, ex coll. O. Conle [ZSMC];

Key to the ♂ of *Mearnsiana*

1. Posterior meso- and metanotals moderately sized and obtusely tuberculiform (Fig. 38E); mesopleurae only with small spiniform tubercles; lateral surfaces of abdominal terga II-IX bright red (Fig. 39) .... ***bullosa***

— Posterior meso- and metanotals large, peg-like with tip acute (Fig. 40D); mesopleurae with a prominentlyenlarged, obtuse median spine; abdominal terga unicoloured (Fig. 40A) .... ***maranao*** **n. sp.**

[The ♀ of *M. maranao* **n. sp.** is not known]

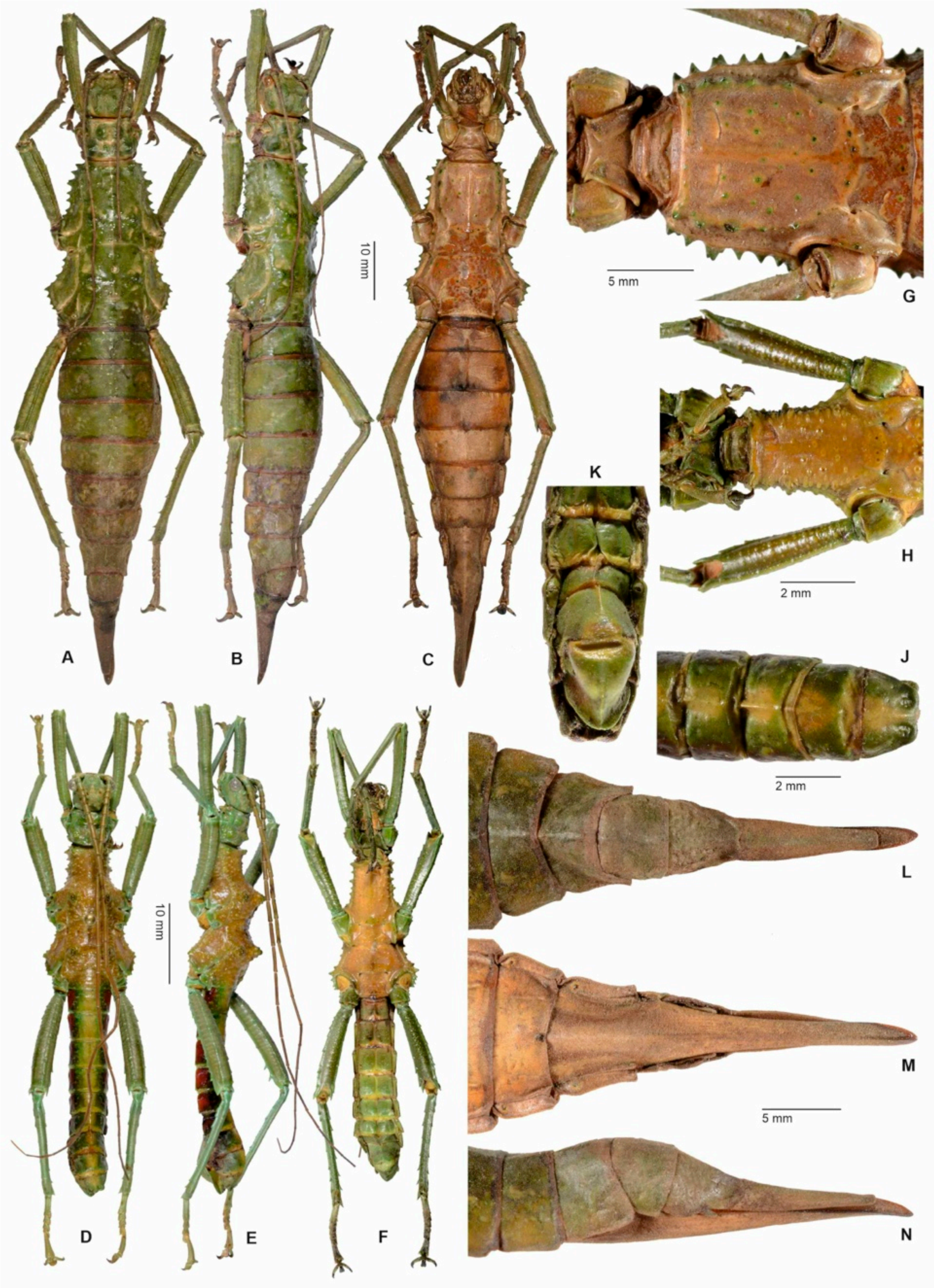

Fig. 38. *Mearnsiana bullosa* Rehn & Rehn, 1939.

– **A**. ♀ dorsal view (Mindanao, South Cotabato Prov., Mount Apo) [FH 0600-3]. – **B**. ♀ dorsolateral view (Mindanao, South Cotabato Prov., Mount Apo) [FH 0600-3]. – **C**. ♀ ventral view (Mindanao, South Cotabato Prov., Mount Apo) [FH 0600-3]. – **D**. ♂ dorsal view (captive reared) [FH 0600-11]. – **E**. ♂ dorsolateral view (captive reared) [FH 0600-11]. – **F**. ♂ dorsolateral view (captive reared) [FH 0600-11]. – **G**. Mesosternum of ♀ [FH]. – **H**. Mesosternum of ♂ [FH]. – **J**. Terminalia of ♂ in dorsal view (Mindanao, Davao del Sur Prov., Mount Talomo) [FH 0600-37]. – **K**. Terminalia of ♂ in ventral view (Mindanao, Davao del Sur Prov., Mount Talomo) [FH 0600-37]. – **L**. Terminalia of ♀ in dorsal view (Mindanao, Davao del Sur Prov., Kapatagan) [FH 0600-25]. – **M**. Terminalia of ♀ in ventral view (Mindanao, Davao del Sur Prov., Kapatagan) [FH 0600-25]. – **N**. Terminalia of ♀ in lateral view (Mindanao, Davao del Sur Prov., Kapatagan) [FH 0600-25].

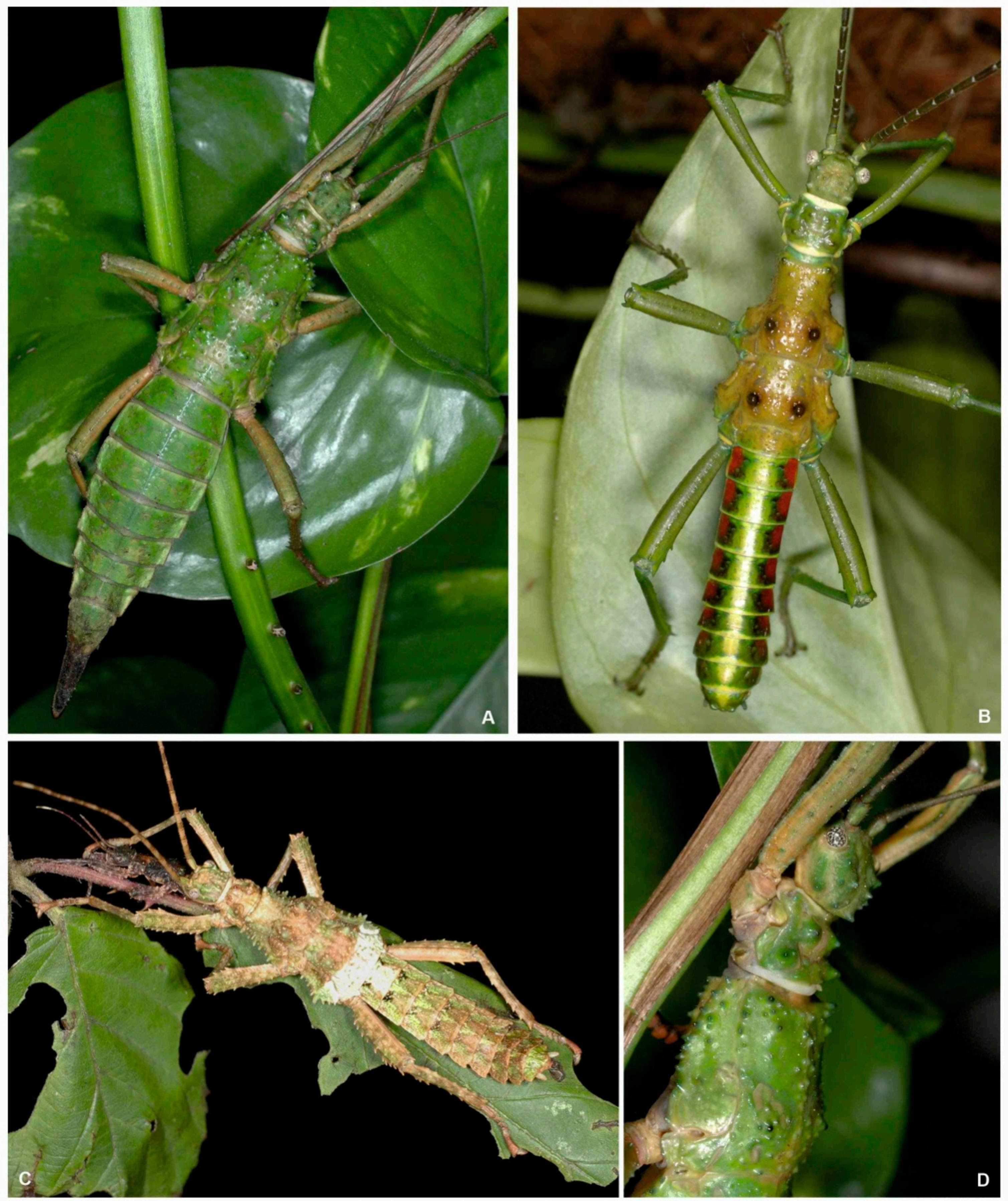

Fig. **39**. *Mearnsiana bullosa* Rehn & Rehn, 1939 live insects (captive reared*)*.

– **A**. ♀ in dorsal view. – **B**. ♂ in dorsal view, showing the bright colours. – **C**. Immature ♂ nymph showing the strong differences if compared to adult insects. – **D**. Closeup of head and thorax of ♀.

PT, ♂: Philippines, Mindanao, 08.2004, ex coll. O. Conle [FH, No. 0600-1];

PT, **1** ♂, **1** ♀: Philippines, Leyte Island, Mt. Balocaue, 02.2005 [OC];

PT, **4** ♂: Philippines, Mindanao, 08.2004 [OC]. (Synonymised by Hennemann *et al*., 2016: 18)

= *Trachyaretaon manobo* Lit & Eusebio, 2005: 80, fig. 2.

HT, ♀: Lake Agco area, Mount Apo (ca. 1.500 m asl), Kidapawan, North Cotabato, 03.V.1988, I.L. lit, Jr. [UPLB, No. PHA-00341];

AT, ♂: Mount Apo, 2004, Tiffany C. Cham Private Coll.) [UPLB, No. PHA-00342];

PT, ♀: Mount Apo, 16.V.1998, Coll. c/v V.P. Gapud [UPLB, No. PHA-00343];

PT, ♀: Mount Apo, 2004, Tiffany C. Cham (Private Coll) [UPLB, No. PHA-00344];

PT, ♀ (juvenile): Mount Apopo (1,790 m asl), Kidapawan, North Cotabato, 27.X.2001, P.L. Alviola III [UPLB, No. PHA-00345];

PT, **3** eggs (ex ovipositor of HT): Lake Agco area, Mount Apo (ca. 1.500 m asl), Kidapawan, North Cotabato, 03.V.1988, I.L. lit, Jr. [UPLB]. (Synonymised by Hennemann et al., 2016: 18).

Material examined

1 ♂: Philippinen, Mindanao Id., VIII.2004 [FH, No 0600-2];

1 ♀, **1** ♂: Philippinen, Mindanao Id. Mount Apo III.2007, leg. R Kabale [FH, No's 0600-3 & 4];

1 ♀ (penultimate instar), **1** ♀ (juvenile), **2** ♂ (juvenile): Philippinen, Mindanao Id., Mount Apo, IV.2004 [FH, No's 0600-5 to 8];

10 ♂, **7** ♀, eggs: ex Zucht: F. Hennemann, 2011-2012, Herkunft: Philippinen, Mindanao Id., South Cotabato Province [FH, No's 0600-9 to 13, 17 to 25];

1 ♀, **1** ♂, **1** ♂ (juvenile): ex Zucht: I. Morisse 2010, Herkunft: Philippinen, Mindanhao Is., South Cotabato Province [FH, No. 0600-14 to 16];

1 ♀, **1** ♂: ex Zucht: A. Esch 2009, Herkunft: Philippinen, Mindanao Id., South Cotabato Province (FH, No's 0600-26 & 27];

1 ♀, **2** ♂: Philippinen, Mindanao Island, Davao del Sur Province, Kapatagan, local collector VII.-VIII.2011 [FH, No's 0600-27 to 29];

2 ♂: Philippinen, Mindanao Island, Davao del Sur Province, Magpet, local collector II.2010 [FH, No's 0600-30 & 31];

1 ♀, **1** ♂: Philippinen, Mindanao Island, Davao del Sur Province, Magpet, local collector X.2009 [FH, No's 0600-32 & 33];

2 ♂: Philippinen, Mindanao Island, South Cotabato Province, Kidapawan, local collector VI.2011 [FH, No's 0600-34 to 35];

1 ♂: Philippinen, Province Surigao del Sur, Tandag, local collector VI.2011 [FH, No. 0600-36];

1 ♂: Philippinen, Province Davao del Sur, Calinan, local collector I.2012 [FH, No. 0600-37];

1 ♂: Philippinen, South Cotabato Province, Mount Matutum, Tupi, local collector V.2011 [FH, No. 0600-38];

1 ♂, **1** ♀: Philippinen, Mindanao Island, Province Davao del Sur, Mount Talomo, local collector VI.2011 [FH, No. 0600-39 & 40];

2 ♀, **5** ♂: Philippines, Mindanao, Leg R. cabale 2011, Gift J. Bresseel; I.G. 32.386 [RBINS];

3 ♀, **5** ♂, **1** ♀ (immature), **1** ♂ (immature): Philippines, Mindanao, Mt Apo, Lake Agco Area, Apr, 2010 [RBINS];

1 ♀: Philippines, Mindanao, Mt Apo, 1200m, sept 2006, local collector [RBINS];

1 ♂: Philippines, Mindanao, Agusan Del Sur, Borbon, Sept 2012, local collector [RBINS];

1 ♀, **1** ♀ (immature): Philippines, Leyte Isl., Mt. Balocaue, 600m, febr. 2008 [RBINS].

Remarks. – This distinctive and very colourful species shows little morphological and chromatic variability. Immature specimens look very different from the adult insects, being brown and having the entire armature of the head, body and limbs much more developed (Fig. 39C). Body lengths: ♀ 81.2-104.0 mm, ♂ 47.0-52.0 mm. In its natural habitats this species has been reported to feed on *Leptostermum* spp. (Myrtaceae) and *Casuarina* spp. (Casuarinaceae). And interesting and rather untypical behaviour for phasmids is, that ♀ of *M. bullosa* lay their eggs in batches of 20 to 30 every two to three weeks. Usually, eggs are laid individually. Culture stock collected by Dave Navarro in April 2008 at Mount Apo was introduced to Europe where the species was first reared by Bruno Kneubühler (Switzerland). A second stock was collected in the Mount Apo area in 2008 by Joachim Bresseel and Mark Bushell. Subsequently, *M. bullosa* was added to the Phasmid Study Group culture list as culture No. 338. In captivity this pretty species is easy to maintain in high humidity. Bramble and raspberry (*Rubus* spp., Rosaceae), roses (*Rosa* spp., Rosaceae), hazel (*Corylus avellana*, Betulaceae), oaks (*Quercus* spp., Fagaceae), salal (*Gaultheria shallon*, Ericaceae) and various other plants are frequently accepted as alternative food plants.

Distribution. – Mindanao & Leyte. Mindanao: Province North Cotabato (Mount Apo 1200 m [USNM – type locality; FH; RBINS]; Mount Apo, Lage Agco area, Kidapawan [UPLB; FH; RBINS]); Province South Cotabato (Mount Matutum, Tupi [FH]); Province Davao del Sur (Kapatagan [FH]; Mount Talomo [FH]; Magpet [FH]; Calinan [FH]); Province Surigao del Sur (Tandag [FH]). Leyte: Masuganao, Mount Balocaue [OC; RBINS].

***Mearnsiana maranao* n. sp.**

(Fig. 40 & 71O)

ZooBank: https://zoobank.org/62EA9912-CD32-4675-87EE-4CFD3AB55F95

HT, ♂: Philippines, Mindanao, Lanao del Norte, local collector [RBINS].

Differentiation. – The ♂ (the only sex known) of this remarkable new species is easily separable from that of the type-species by the generally more developed body and leg armature, stockier limbs and unicoloured abdominal terga (red laterally in *bullosa*). The compound posterior meso- and metanotals have the central protrusion much larger and almost equal to the height to the thorax, elongate peg-like in shape and with the apex acute (Fig. 40D, much lower and obtusely rounded in *bullosa*). Moreover, there is a notably enlarged median mesopleural spine and also the pair of anterior mesonotals are considerably longer and more spiniform.

Etymology. – Named after the Maranao people, a predominantly Muslim Filipino ethnic group native to the region around Lanao Lake on the Island of Mindanao. Their name means "people of the lake".

Description

The following description is based on the unique dried holotype, which however seems to have the colour very well preserved.

♂ (Fig. 40)

Form and colouration. – Size slightly smaller than the type-species (body length 43.5 mm), form short and stocky with practically all elements of armature more strongly developed if compared to *M. bullosa*; body surface roughened, with numerous irregularly spaced rounded granules. Colouration mostly olive with the meso- and metathorax orangey ochre to russet; all tubercles and spinose projections of the head and thorax dark orange. Antennae reddish brown and gradually becoming darker towards the apex; the two basal joints olive. Limbs dark greyish olive with all tubercles and teeth buff ventrally and orange dorsally; all femora becoming slightly lighter in colour towards the base.

Head. – Subquadrate with vertex gently rounded; supra-orbital fairly distinct and notably larger than the single pair of coronals; median coronals small and the lateral coronals the most prominent spines of the head; otherwise only with a small gular tubercle as well as one or two small posterior supra-orbitals (Fig. 40D). Eyes large, projecting more than hemispherical and their diameter scarcely less than length of gena. Antennae

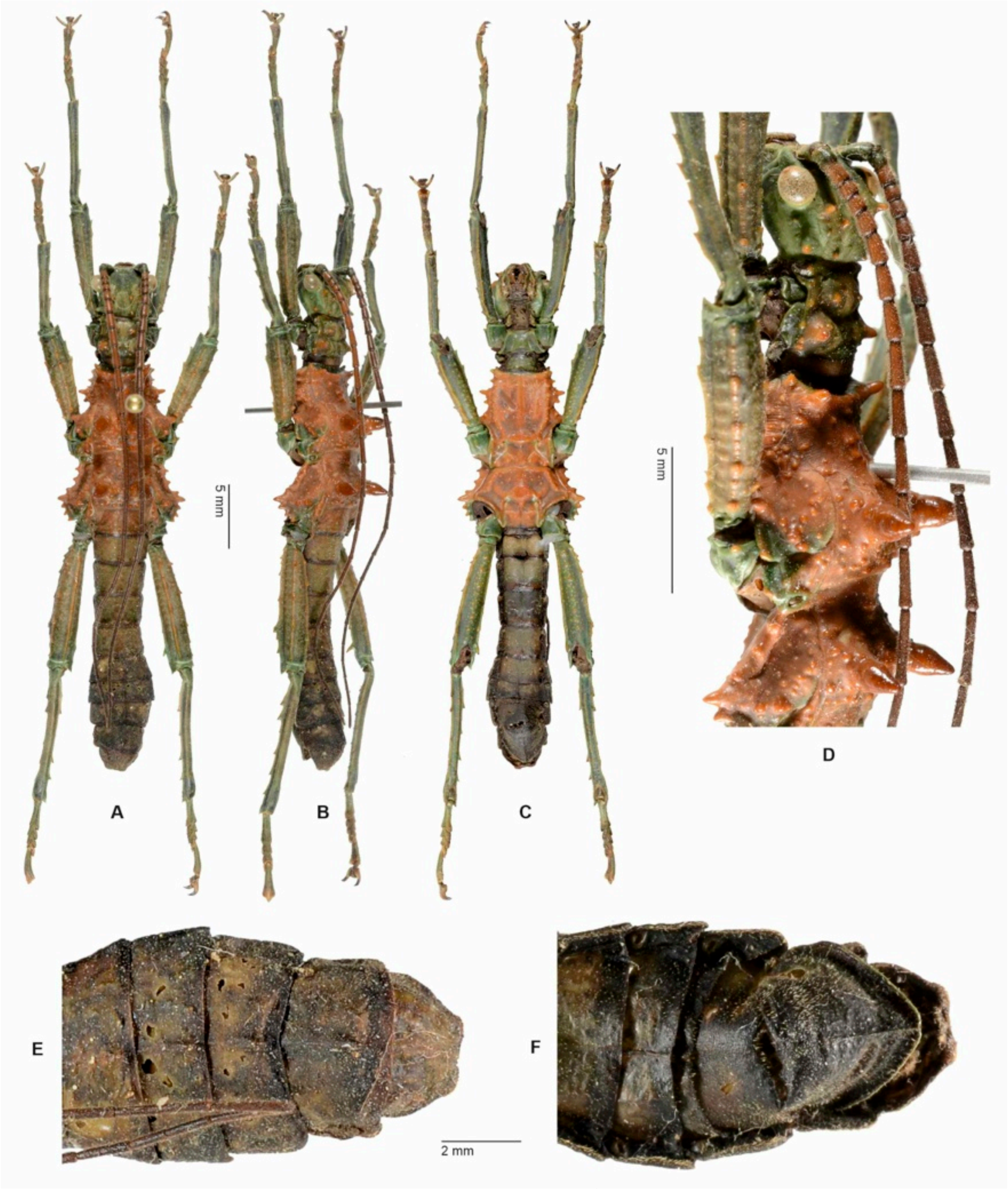

Fig. 40. *Mearnsiana marnao* **n. sp.** ♂ holotype [RBINS].

– **A**. Habitus dorsal view. – **B**. Habitus dorsolateral view. – **C**. Habitus ventral view. – **D**. Head and thorax in dorsolateral view. – **E**. Terminalia in dorsal view. – **F**. Terminalia in ventral view.

with 26 joints and reaching to anal segment; scapus somewhat compressed dorsoventrally and roundly rectangular in outline, pedicellus globose and much shorter, III somewhat longer and slenderer than pedicellus, IV very short and the following gradually increasing in the length with the median antennomeres in particular strongly elongate.

Thorax. **–** Pronotum about as long but a little narrower than head and slightly transverse with a distinct pre-median narrowing. Armed with a low pair of anteriors and a prominent pair of conically elevated posteriors (Fig. 40D), which each have a small tubercle at their base intero-anteriorly; antero- and postero-lateral pronotals small and rather obtuse. Transverse median sulcus distinct and with a short, gently curved impressed furrow on each side of the median line; the latter somewhat impressed. Mesothorax notably widening towards the posterior and about 1.8x longer than prothorax; the mesonotum with lateral margins notably concave medially and somewhat widened pre-posteriorly, almost 1.6x longer than width of anterior margin and the posterior portion notably inflated. Mesonotum with a distinct transverse bulge shortly behind anterior margin, which laterally terminated in a distinct, conical anterior mesonotal spine, the antero-lateral mesonotal notably smaller. The compound posterior mesonotals very large, conically peg-like in shape with the apex rather acute (Fig. 40D). Lateral margins with a somewhat enlarged pre-lateral tubercle and surface otherwise set with unequally sized low tubercles and granules; only the pair of pre-medials and inter-posteriors slightly enlarged. Metanotum sun-quadrate with the lateral margins weakly concave; the posterior metanotals similar to posterior mesonotals (Fig. 40D); the metanotum otherwise only set with unevenly sized granules and low tubercles; the posterior series somewhat enlarged. Mesopleurae deflexed posteriorly and armed with a rather small and stout antero-lateral, a prominent, spinose and compound medio-lateral (Fig. 40A) and a very strong, compound supra-coxal; the two mesopleurals of average size, obtuse and shiny. Metapleurae almost semi-circularly deflexed in posterior half; armed with two blunt laterals, five obtuse supra-coxal, the second of which is notably enlarged, and two obtuse, shiny metapleurals. Sensory-areas of prosternum weakly developed. Mesosternum flattened, almost smooth in central portion and with a low medio-longitudinal bulge; laterally with a gently arched longitudinal carina that is set with some unevenly sized blunt tubercles (Fig. 40C). Metasternum only with a marginal lateral row of 4-5 low tubercles and a few scattered granules in anterior half (Fig. 71O).

Abdomen. – Median segment distinctly transverse and trapezoidal in shape; the posterior margin with a full series of posterior granules and a pair of small medial granules present. All abdominal segment transverse, II- V increasing in length and narrowing, VI-VII notably widening and VIII-X narrowing yet again; V narrowest (except for anal segment) and VII widest all off segments; V 1.6x and VII 3x wider than long. Terga II-VI with a row of small posterior granules along posterior margin, VI-X with a low and obtuse medio-longitudinal bulge, which terminates in an obtuse posteromedian hump on VI-VIII. Sterna II-VII smooth and only with a faint medio-longitudinal line. Tergum VIII with posterolateral angles somewhat protruded and dentiform. Anal segment distinctly trapezoidal in outline with posterior margin strongly narrowed and weakly indented medially (Fig. 40E); notably declining in lateral view. Epiproct small, transverse and almost fully concealed under anal segment. Cerci small, compressed laterally and weakly carinated dorsally and ventrally. Poculum large, bulgy and almost reaching to tip of anal segment; the posterior portion with a fine medio-longitudinal keel and the posterior margin somewhat labiate and narrowing (Fig. 40F).

Legs. – All very stocky with the femora somewhat inflated; basal flexure of profemora weak. Femora with a few low dentations ventrally, the terminal tooth on posteroventral carina of metafemora forming a rather distinct, acutely pointed spine; dorsal carinae each with a few small tuberculiform and rather obtuse teeth. Ventral surface of femora minutely granulose and with a median row of small, rounded tubercles; that of tibiae similar but tectate medio-longitudinally. Tibiae smooth dorsally and with 3-6 sharp dentations on two exterior ventral carinae. Tarsi almost as long as corresponding tibiae, basitarsus almost as long as three proceeding tarsomeres taken together. Claws large, as typical for the genus.

Measurements [mm]. – Measurements [mm]: Body 43.5, pronotum 3.8, mesonotum 7.4, metanotum 4.9, median segment 2.0, profemora 9.9, mesofemora 8.3, metafemora 10.3, protibiae 9.0, mesotibiae 8.1, metatibiae 11.8, antennae 40.0.

Remarks. – Females and eggs unknown.

Distribution. – Mindanao, endemic.

Genus ***Obrimus*** Stål, 1875

Differentiation. – This genus is closely related and morphologically most similar to *Brasidas* but differs by having the metasternum just slightly invaginated with the metapleurae folded under so that that this area appears to be partially covered by a flap, giving the appearance of shallow slit-like invaginations along the lateral margin, whereas in *Brasidas* the metasternum has deep, open pits or holes which are somewhat removed from the lateral margins. The eggs are readily separated from those of *Brasidas* by their typical capsule shape, having the anterior end constricted and the polar-area with two obtuse bumps or swellings in centre (Fig. 73N-Q). In general shape however, they remarkably resemble those of *Sungaya* Zompro, 1996 but are easily distinguished by having the polar area with two obtuse bumps (one central protrusion in *Sungaya*).

Remarks. – Molecular studies have revealed *Obrimus* as the sister-taxon of *Brasidas* (Brank *et al*., 2021). The numerous citations of *Obrimus* may be referred to in the Phasmida Species File (http://Phasmida.SpeciesFile.org).

Distribution. – Philippines, endemic. So far recorded only from the island of Luzon.

Keys to the species of *Obrimus*

♂*

1. Abdominal terga II-IV spinose **2**

— Abdominal terga unarmed . . . . ***quadratipes***

2. No median mesonotals; abdominal terga VI-IX unarmed, simple **3**

— Mesonotum with a moderate pair of median mesonotals; abdominal terga VI-IX each with a distinct triangular, tooth-like posterolateral projection . . . . ***mesoplatus***

3. Small (body length < 70.0 mm); thorax with a pale medio-longitudinal dorsal stripe (Fig. 44D); anal segment hexagonal in dorsal aspect with a deep but narrow posteromedian incision (Fig. 41H); vomer with a long and slender, spiniform terminal hook (Fig. 72H), South Luzon . . . . ***bicolanus***

— Large (body length > 70.0 mm); no pale medio-longitudinal stripe on thorax; anal segment almost rectangular and slightly transverse with posterior margin weakly bi-lobed (Fig. 42H); vomer broad, triangular with a short and strong terminal hook, Central Luzon . . . . ***bufo***

* ♂ of ***O***. ***uichancoi*** Rehn & Rehn, 1939 are not known.

♀*

1. Mesonotum with a prominent pair of median mesontal spines; abdominal terga I-VI with distinct medials **2**

— Median mesonotals missing or very indistinct (Fig. 43B); medials of abdominal terga I-VI missing or at best represented by a pair of small tubercles (Fig. 43A-B); Northern Luzon . . . . ***uichancoi***

2. Small (body length < 100.0 mm); no anterior pronotals (Fig. 41B); abdominal terga II-V with a distinct post-median lateral spines; South-Luzon . . . . ***bicolanus***

— Large (body length > 100.0 mm); anterior pronotals distinct (Fig. 42B); lateral margins of abdominal terga II-V unarmed (Fig. 42A); Central Luzon . . . . ***bufo***

* ♂ of ***O***. ***mesoplatus*** (Westwood, 1848) and ***O***. ***quadratipes*** Bolívar, 1890 are not known.

Species included

1. ***Obrimus bicolanus*** Rehn & Rehn, 1939: 428, pl. 32: 15, 38: 41.
Distribution: Luzon.

2. ***Obrimus bufo*** (Westwood, 1848: 77, pl. 38: 3).
Distribution: Luzon.

3. ***Obrimus mesoplatus*** (Westwood, 1848: 77, pl. 38: 4).
Distribution: Luzon.

4. ***Obrimus quadratipes*** Bolívar, 1890: 307. **rev**. **comb**.
Comment: The holotype of this species is a penultimate instar ♂ nymph. Examination has proven the specimen to have no metasternal foramina but merely slit-like impression near the lateral margins of the metasternum. This places the species in *Obrimus* and not in *Brasidas*. Rehn & Rehn (1939: 435) apparently transferred the species to *Brasidas* based on misidentified material, since the metanotum shown on plate 38: 43 clearly shows cingulate metasternal pits. Thus, the species is here re-transferred to its original genus.
Distribution: Luzon.

5. ***Obrimus uichancoi*** Rehn & Rehn, 1939: 426, pl. 31: 7, 32: 14, 38: 42.
Distribution: Luzon.

Obrimus bicolanus Rehn & Rehn, 1939

(Fig. 41, 44A-D, 70R-S, 72H & 73N-O)

Obrimus bicolanus Rehn & Rehn, 1939: 428, pl. 32: 15, 38: 41.

HT, ♀ (penultimate instar): Bulusan, Sorsogon, Luzon, Philippines (W. Boettcher); *Obrimus bicolanus* Rehn + Rehn, Type 1297, Hebard Cln; Data Base Serial No. assigned as Type No. September 2008, Type [ANSP].

- Otte, 1978: 79. (Type data)
- Zompro, 2004: 215.
- Otte & Brock, 2005: 228.
- Harman, 2015: 26. (Notes on origin of culture stock)
- Hennemann et al., 2016: figs. 21-22, 39, 45-46.
- Brock & Büscher, 2022: 521.

Material examined

19 ♀, **22** ♂, eggs: ex Zucht F. Hennemann 2011-2014, Philippinen, SO-Luzon, Prov. Bicol, Sorsogon, Pocdol Mts., Mt. Pulog NP, Mt. Pulog X.2010 [FH No's 0730-1 to 41 & E];

2 ♀: Philippinen, S-Luzon Id., Bicol Region, Provinz Sorsogon, Pocdol Mountains, local collector X.2010 [FH 0730-42 & 43];

1 ♂: Philippines, Luzon, Bicol, Mt. Osiao, Leg T. Heitzmann & A. Kang, X.2009 [RBINS];

2 ♀, **1** ♂: Ex Breeding J. Bresseel 2012; Origin: Philippines, South-East Luzon, Bicol Province, Sorsogon, Pocdol Mts., Mt Pulog 2011, T. Heitzmann [RBINS];

2 ♀, **1** ♂: Ex Culture Bresseel 2013; Origin: Philippines, Luzon, Sorsogon, Bicol Province, Pocdol Mountains, leg Heitzmann X.2010 [RBINS].

Differentiation. – In size and shape this species is fairly alike *uichancoi* whereas the strongly developed body spination strongly resembles *bufo*. From *uichancoi*, these ♀ may be separated by the distinct median mesonotals as well as the distinct medials and second paired posteriors of the abdominal terga I-VI, but having the pair of posterior mesal pronotals just weakly developed, and having the triangular median excavation of the anal segment notably smaller and narrower (Fig. 41K). From the much larger *bufo* these ♀ differ by the somewhat stockier shape, lack of anterior pronotals (Fig. 41B), presence of second paired posteriors on abdominal terga II-VI, presence of a distinct post-median lateral spines on abdominal terga II-V (Fig. 41A) and a differently shaped praeopercular organ, which consist of a pair of oval swellings near posterior margin of sternum VII (Fig. 41L). Males strongly resemble those of *bufo* and basically agree in the head and body armature. They may however be distinguished by the shape of the anal segment, which is rather hexagonal in shape (Fig. 41H, distinctly transverse in *bufo*), has the posterior margin narrower and lacks the two pits near each posterolateral angle seen in *bufo*, as well as the much differently shaped vomer (Fig. 72H), that has the entire apical half strongly constricted to form a very long and slender, spiniform terminal hook. The eggs (Fig. 73N-O) differ from those of *bufo* by the less inflated micropylar plate and the larger opercular angle (-25° *vs*. -15° in *bufo*).

Variability. – The specimens examined show no noteworthy variability in the head and body armature other than slight variation in the developments of the spines. The variability is even less in ♂. The colouration of ♀ however varies from various tones of grey, ochre, drab and brown (Fig. 44A) to dark green or olive and specimens are almost always to a variable degree irregularly flecked with darker tones of brown (Fig. 44B-C). Occasionally, there may also be some irregularly dispersed white dots on abdominal tergum IV /Fig. 44C). Males show some variation in the intensity of the pale cream or straw-coloured medio-longitudinal dorsal streak on the thorax and basal three abdominal terga as well as the ferruginous lateral surfaces of the mesothorax. Body lengths: ♀ 83.5-98.0 mm, ♂ 61.8-67.0 mm.

Remarks. – This species was described from a unique penultimate instar ♀ nymph from Bulusan, Bicol Province in the collection of ANSP. There have not yet been formal descriptions of the adult ♀ and ♂ but since the species is being reared in captivity there are numerous pictures of live specimens available in the internet. Culture stock collected by Thierry Heitzmann (Philippines) on Mount Pulog, Bicol Province in October 2010 was added to the Phasmid Study Group culture-list as culture No. 324. Infotrmation on the culture history and captive breeding was provided by Dräger (2014: 9). It is easy to rear in humid conditions and accepts various alternative food-plants in captivity including bramble and raspberry (*Rubus* spp., Rosaceae), roses (*Rosa* spp., Rosaceae), hazel (*Corylus avellana*, Betulaceae), oaks (*Quercus* spp., Fagaceae), salal (*Gaultheria shallon*, Ericaceae) and hawthorn (*Crategus* spp., Rosaceae). The eggs are described in detail below.

Egg (Fig. 73N-O). – Large, bulgy and of typical shape for the genus; capsule slightly arched, with a conspicuous constriction anteriorly and posteriorly and the polar area indented transversely; the dorsal surface much more convex than ventral surface. Surface smooth but very sparsely, minutely and rather irregularly pitted; a rim of somewhat larger pits along the anterior margin. Micropylar plate very slightly inflated and weakly raised above capsule surface, sculptured like capsule; shape broadly T-shaped with the median portion as well as the two lateral extensions rounded at the apex; posteromedian portion triangularly excavated and with a small bowl-shaped micropylar cup. Median line an obtuse keel that reaches to the anterior protrusion of polar area. Operculum circular, flat and pitted like capsule; opercular angle *ca*. -25°. Colour plain grey, the outer margin of the micropylar plate darker grey and the outer margin of the operculum blackish. Measurements [mm]: Length 5.4-5.5, width 3.7-3.8, height 3.9-4.0, length of micropylar plate 3.8.

Distribution. – South Luzon, Bicol Region, Province Sorsogon (Bulusan [ANSP – type-locality]; Pocdol Mountains, Mount Pulog [FH, RBINS]; Mount Osiao [RBINS]).

Obrimus bufo (Westwood, 1848)

(Fig. 42, 70T-U & 73P-Q)

Phasma (Acanthoderus) bufo Westwood, 1848: 77, pl. 38: 3.

LT (by present designation), ♀: W16; *Phasma acanthoderus Bufo* Westw. Cab Orient. Pl. 38: 3, Phil. Islands D. Cuming; Type. Westwood. *Phasma (Acanthoderus) bufo*. Cab. Orient. Entom. 1848, p.77, pl.38,f.3.; Type Orth: 492. *Phasma Acanthoderus bufo* Westw., Hope Dept. Oxford [UMO];

PLT, ♀: Syntype; Phil Isla; *Acanthoderus Bufo* Westw., Philippine Isl.; BMNH(E) #845223 [NHMUK].

PLT, ♀: Syntype; *Phasma (acanthoderus) bufo* Westw. Orient. Ent. t38 f3; BMNH(E) #845224 [NHMUK];

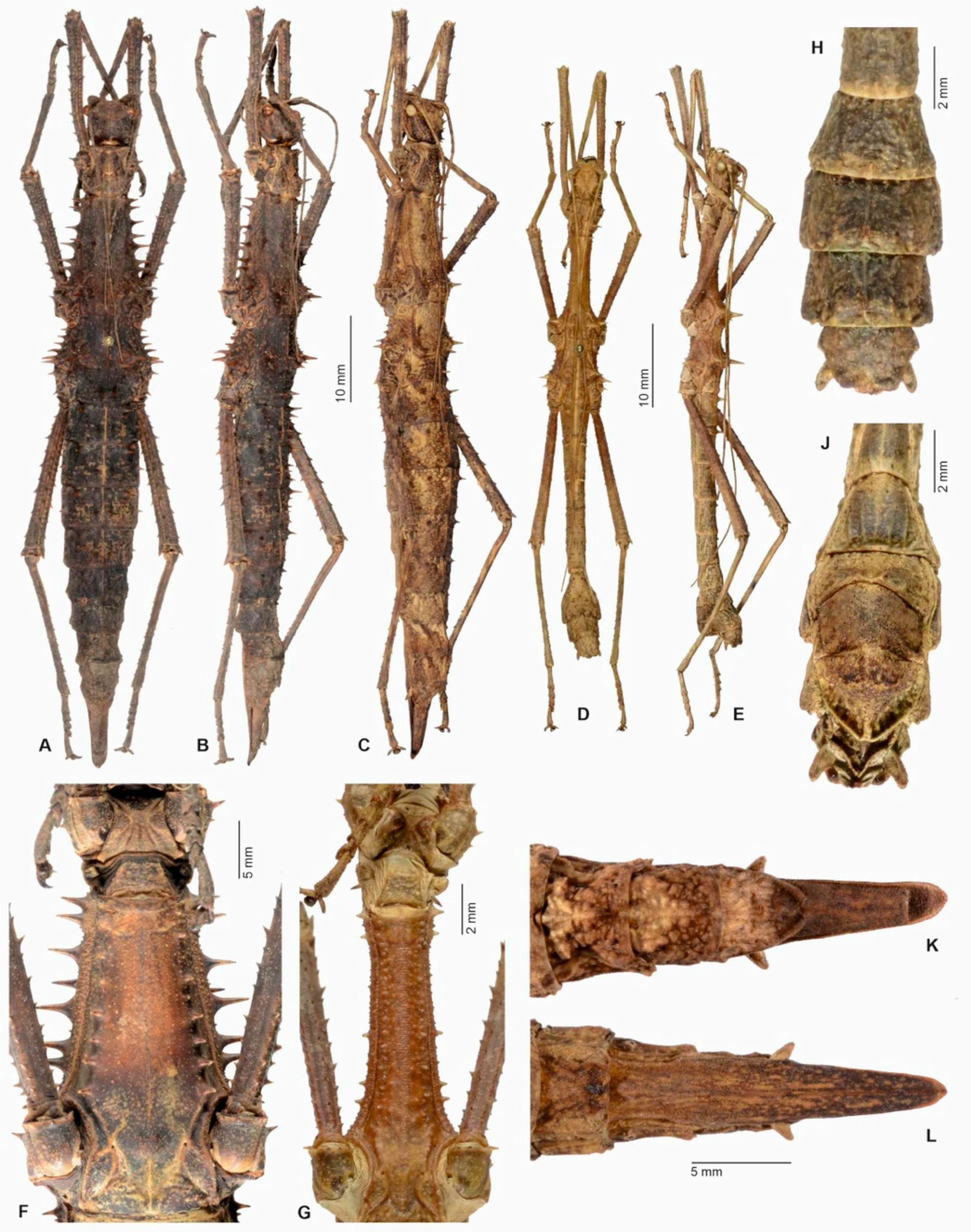

Fig. **41**. *Obrimus bicolanus* Rehn & Rehn, 1939.

– **A**. ♀ dorsal view (S-Luzon, Bicol, Sorsogon Province) [FH 0730-42]. – **B**. ♀ dorsolateral view (S-Luzon, Bicol, Sorsogon Province) [FH 0730-42]. – **C**. ♀ dorsolateral view (reared from S-Luzon, Bicol, Sorsogon Province, Pocdol Mts.) [FH 0730-5]. – **D**. ♂ dorsal view (Mindanao, Agusan del Sur Prov., Sibagat) [FH 0730-40]. – **E**. ♂ dorsolateral view (Mindanao, Agusan del Sur Prov., Sibagat) [FH 0730-40]. – **F**. Mesosternum of ♀ [FH 0730-42]. – **G**. Mesosternum of ♂ [FH]. – **H**. Terminalia of ♂ in dorsal view [FH]. – **J**. Terminalia of ♂ in ventral view [FH]. – **K**. Terminalia of ♀ in dorsal view [FH]. – **L**. Terminalia of ♀ in ventral view [FH].

PLT, ♀ (nymph): Syntype; Phil Isla, 44-22; *Acanthoderus bufo* Westw. Type.; *Acanthoderus bufo* Westw.; BMNH(E) #845222 [NHMUK].

Acanthoderus bufo, Westwood, 1859: 51, pl. 2: 6.
- Elera, 1895: 200.

Obrimus bufo, Stål, 1875: 92.
- Kirby, 1904: 398.
- Redtenbacher, 1906: 40.
- Bruner, 1915: 229.
- Rehn & Rehn, 1939: 425.
- Zompro, 2004: 215, fig.
- Otte & Brock, 2005: 228.
- Brock et al., 2016: 163. (Type data)
- Brock & Büscher, 2022: 521.

Material examined

1 ♀, **1** ♂, **1** egg (ex ovipositor): Philippinen, N-Luzon Id., Provinz Ilocos Norte-Far, Pagudpod, sealevel, local collector, 8.VI.2010 [FH, No's 1351-1, 2, E];

1 ♀, **1** ♂: Coll. R.I.Sc.N.B., Philippines, Luzon, Ilocos, Leg. T. Heitzmann & A. Kang [RBINS].

Differentiation. – This is the largest species in the genus and thus both sexes are readily separated from the other congenerics by the notably larger size. In the distinct body armature ♀ resemble *bicolanus* but they differ by the somewhat slenderer shape (Fig. 42A-B), presence of a small but notable pair of anterior pronotals (Fig. 42B), lack of second paired posteriors on abdominal terga II-VI, and differently shaped praeopercular organ, which is a transverse and slightly bi-gibbose swelling at posterior margin of abdominal sternum VII (Fig. 42L). The previously unknown ♂ strongly resemble those of *bicolanus* but can be distinguished by the shape of the anal segment, which is transverse and rather rectangular in shape and has the posterior margin broader, weakly bilobed and with a shallow pit near each posterolateral angle (Fig. 42H), as well as the much broader, basically triangular vomer, that has just a short terminal hook (apex strongly narrowed with terminal hook long, slender and spiniform in *bicolanus*). The eggs (Fig. 73P-Q) differ from those of *bicolanus* by the inflated micropylar plate, which is notably raised above the capsule surface, and the smaller opercular angle (-15° *vs*. -25° in *bicolanus*).

Description of ♂ (Fig. 42C-D)

Form and colouration. – Size large (body length 68.5-73.0 mm), form moderately stocky for the genus; body surface slightly glossy, minutely granular but appearing rather smooth and with fairly prominent spination. General colour of the unique dried specimen at hand ochraceous mid brown with the terminal five abdominal segments and the ventral surface of the abdomen rather fawn; median portions of meso- and metanotum dark green; major spines of the body fuscous to blackish. Antennae brown basally and gradually becoming buff towards the apex.

Head. – Roundly rectangular, a little longer than broad, vertex rather flattened and with a fine coronal fissure; surface sparsely granulose. Median coronals and occipitals prominent, acutely spinose and roughly equal in size, the supra-orbitals similar in size; two pairs of small occipital medials present and the lateral coronals distinct but somewhat smaller than the median coronals. Genae with a fairly distinct posterior gular and a much smaller one in front. Antennae very long and reaching to abdominal segment VIII, the median joints strongly elongated, the scapus just slightly compressed dorso-ventrally.

Thorax. – Pronotum slightly longer than head, the anterolateral angles deflexed and with a shallow narrowing pre-medially; the transverse median sulcus faint; just behind it a very prominent pair of slender, upright and acutely pointed medial spines, in front with a small rather tuberculiform pair of posterior mesal prtonotals. Antero-lateral and inter-posterior pronotals subobsolete. Mesothorax moderately slender and prominently inflated posteriorly; about 2.7x longer than prothorax, the mesonotum about 4x longer than wide. Anterior mesonotals distinct simple spines, the posterior mesonotals large and compound with two smaller spines at the base, that are roughly half the size and accompanied by a few small tubercles. Posterior metanotals essentially alike but a little larger than the mesonotals and the two spines at the base much smaller; metanotum strongly trapezoidal in shape. Mesopleurae with a distinct spinose antero-lateral, a small but acute medio-lateral and two medium-sized spinose supra-coxal; mesopleural very prominent and stronger than all other mesothoracic spines. Metapleurae with an even larger metapleural spine, which is the largest of all body spines; margin with one small lateral as well as four small supra-coxals in front and two noticeably larger ones posteriorly. Mesosternum fairly smooth with only very indistinct and low mesosternals and a pair of node-like swellings anteriorly (Fig. 42F). Metasternum only with six granular metasternals; the lateral folds shallow and very narrow (Fig. 70U).

Abdomen. – Median segment with anterior margin strongly narrowed and rounded, almost semi-circular in shape. Segments II and IV slightly trapezoidal, III-VI uniform in width, rectangular and an average 1.4x longer than wide; II-IV slightly decreasing, V-VII decreasing in length. All smooth except for a prominent pair of slender, upright and acutely pointed anterior spines on II-IV (Fig. 42D). Sterna smooth. Terga VIII and IX with lateral margins somewhat deflexed and rounded and the posteromedian portion obtusely inflated. Anal segment notably shorter than IX and wider than long, the lateral margins gently convex basally then concave; posterior portion notably narrowed and the posterior margin roundly angular to weakly bi-lobate with a small indention medially; dorsally there is a prominent impression near each outer angle (Fig. 42H), which are set with black denticles ventrally. Epiproct scale-shaped and transverse. Cerci somewhat compressed laterally and tapering towards a blunt tip. Vomer basically triangular, wider than long and with a short rather conical terminal point. Poculum large, bulgy, cup-shaped and reaching to posterior of anal segment (Fig. 42G); the posterior margin strongly labiate and forming a somewhat narrowed flange (Fig. 42J).

Legs. – All long, slender and femora with all carinae densely set with small but acutely spinose teeth (ventral carinae of meso- and metafemora in particular), the terminal three or so of which are much elongated and spiniform; teeth generally less pronounced dorsally. Medioventral carina faint and set with a few small spines. Curvature of profemora indistinct. Tibiae smooth dorsally and minutely denticulated ventrally. Basitarsi elongate and as long as proceeding three joints taken together.

Measurements [mm]. – Body 68.5-73.0, pronotum 5.2-5.4, mesonotum 13.9-14.1, metanotum 6.2-6.5, median segment 4.8-4.9, profemora 17.8-18.5, mesofemora 14.2-15.4, metafemora 20.5-22.3, protibiae 19.2-19.3, mesotibiae 15.1-15.8, metatibiae 22.7-23.5, antennae 67.0.

Variability. – The six known ♀ of this species show slight variability in the development of the thoracic armature and size of the spines on the abdominal terga. While the lectotype is rather buffy brown one of the paralectotypes in NHMUK is dark ferruginous brown and the example in the authors collection ochraceous mid brown with a slight olive wash. The specimen from "Manilla" in the collection of NHMW has the body armature somewhat more distinct than all other examined specimens. Body lengths: ♀ 106.0-109.0 mm, ♂ 68.5-73.0 mm.

Remarks. – Westwood (1848) originally described this species from four specimens, three adult ♀ and an immature ♀. The specimen in the collection of UMO is here chosen as the lectotype to guarantee stability of Westwood's taxon. Apparently, this is the specimen that Westwood (1848) illustrated. The two specimens at hand from the authors collection provide the first definite record of *O. bufo* since the original type material. The ♂ was previously unknown and is described herein and an egg extracted from the ovipositor of the ♀ serves to present a description.

The collection of RBINS contains a ♀ and three ♂ from Santa Ana, Province Cagayan and a ♀ from Isabela Province. These specimens generally key out as *bufo*, but the ♂ are notably slenderer in shape than the types and examined additional specimens from the Ilocos Province. These ♂ have the mesonotum 5.4x longer than wide compared to 4.2x in the Ilocos examples and whereas the mesonotum is 3.25x longer than the pronotum it is only 2.75x longer than the pronotum in the Ilocos specimens. Otherwise, there are no morphological differences except for

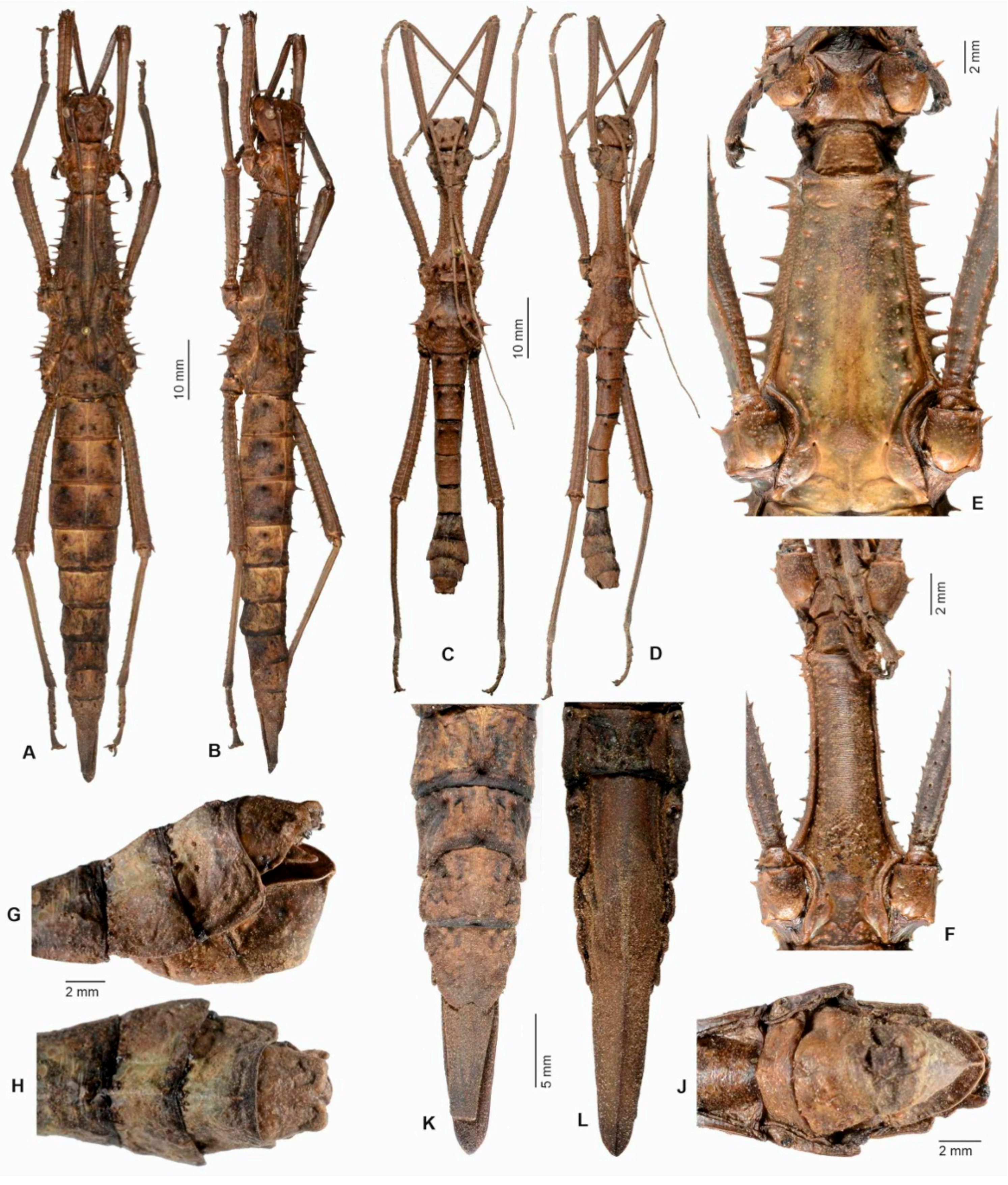

Fig. **42**. *Obrimus bufo* (Westwood, 1859).

– **A**. ♀ dorsal view (N-Luzon, Ilocos Norte -Far Province, Pagudpod) [FH 1351-1]. – **B**. ♀ dorsolateral view (N-Luzon, Ilocos Norte - Far Province, Pagudpod) [FH 1351-1]. – **C**. ♂ dorsal view (N-Luzon, Ilocos) [RBINS]. – **D**. ♂ dorsolateral view (N-Luzon, Ilocos) [RBINS]. – **E**. Mesosternum of ♀ [FH 1351-1]. – **F**. Mesosternum of ♂ [FH 1351-2]. – **G**. Terminalia of ♂ in lateral view (N-Luzon, Ilocos) [RBINS]. – **H**. Terminalia of ♂ in dorsal view (N-Luzon, Ilocos) [RBINS]. – **J**. Terminalia of ♂ in ventral view (N-Luzon, Ilocos) [RBINS]. – **K**. Terminalia of ♀ in dorsal view [FH 1351-1]. – **L**. Terminalia of ♀ in ventral view [FH 1351-1].

the Santa Anan specimens being more greenish in colour. The ♀ from Santa Ana shows no morphological differences from the typical Ilocos specimens and the large ♀ from Santa Isabel Province (114.0 mm) merely differs by having the posterior margin of the anal segment less distinctly indented and the body segments scarcely longer in relation. Although it is believed that these specimens are likely to represent a distinct species, they are for now not further treated herein and it is hoped that more fresh material from throughout northern Luzon and perhaps DNA barcoding will solve clarifying their identity and taxonomic status. Therefore, the localities are not included in the distribution of *bufo*.

Egg (Fig. 73P-Q). – The unique egg that could be extracted from the ovipositor of the ♀ in the author's collection is undamaged but discoloured. While the entire left side is mostly black, much of the right side is ochraceous mid grey. Comparison with other eggs of Obriminae but the congeneric *O. bicolanus* in particular suggest the left side to be darkened and grey to be the natural colour.

Large, bulgy and of typical shape for the genus; capsule slightly arched, with a conspicuous constriction anteriorly and posteriorly and the polar area indented transversely; the dorsal surface more convex than ventral surface. Surface smooth but very sparsely and minutely pitted. Micropylar plate inflated and noticeably raised above capsule surface, sculptured like capsule; shape broadly T-shaped with the median portion as well as the two lateral extensions broadly rounded at the apex; posteromedian portion widely excavated triangularly and with a small bowl-shaped micropylar cup. Median line an obtuse keel that reaches to the anterior protrusion of polar area. Operculum circular, flat and pitted like capsule; opercular angle *ca.* -15°. Colour ochraceous mid grey, the outer margin of the micropylar plate buff and the outer margin of the operculum blackish. Measurements [mm]: Length 5.3, width 3.0, height 3.8, length of micropylar plate 3.9.

Distribution. – Luzon, endemic. Luzon: Province Manila [NHMW]. North Luzon: Ilocos Norte-Far Province (Pagudpod [FH]).

Obrimus uichancoi Rehn & Rehn, 1939

(Fig. 43 & 44E)

Obrimus uichancoi Rehn & Rehn, 1939: 426, pl. 31: 7, 32: 14, 38: 42.

HT, ♀ (juvenile): Ripang, Feb. 1918 (W. Boettcher); *Obrimus uichancoi* Rehn + Rehn Type, Hebard Cln [ANSP].

- Otte, 1978: 79. (Type data)
- Zompro, 2004: 215.
- Otte & Brock, 2005: 228.
- Brock & Büscher, 2022: 521.

Material examined

6 ♀: Philippinen, N-Luzon Island, Mountain Prov., Cordillera, Bay-Yo village, 1200 m, local collector, I.2010 [FH, No's 1347-1 to 6];

2 ♀: Philippinen, N-Luzon Id., Provinz Ifuago, Central Cordillera, Mayoyao, *ca.* 450 m, local collector, 15.II.2011 [FH, No's 1347-7 & 8];

1 ♀: Philippinen, N-Luzon Id., Provinz Ifuago, Central Cordillera, Kinakin, 1300 m, local collector, 3.X.2010 [FH, No. 1347-9];

2 ♀: Coll. R.I.Sc.N.B., Philippines, Luzon, Nueva Vizcaya, Bay-Yo, VI.2012, leg. A. Kang [RBINS];

1 ♀: Coll. R.I.Sc.N.B., Philippines, Luzon, Banaue, Kinakin, leg. T. Heitzmann [RBINS].

Differentiation. – Females of this rarely known species (the only sex known) basically differ from the two other known ♀ of the genus, this is *O. bicolanus* and *O. bufo*, by the notably less pronounced body armature, which concerns to the meso- and metapleural spines in particular. From those of *bicolanus*, to which they show the closest overall resemblance, these ♀ may also be separated by the very indistinct median mesonotals (Fig. 43B) as well as medials and second paired posteriors of the abdominal terga I-VI (Fig. 43B), but instead having a fairly distinct pair of posterior mesal pronotals that are about half the size of the posteriors, and having the triangular median excavation of the anal segment broader and larger (Fig. 43C). From the ♀ of *bufo*, those of *uichancoi* readily differ by the smaller size and somewhat stockier shape, having abdominal segments III-IV almost 2x wider than long (Fig. 43A, only 1.6x wider than long in *bufo*), strong lateral coronals, slightly deflexed and obtusely dentiform posterior portions of the lateral margins of abdominal terga V-VIII and differently shaped praeopercular organ (Fig. 43D), which consists of two oval swellings (a transverse and slightly bi-gibbose swelling at posterior margin in *bufo*).

Remarks. – This species has not been recorded since its description, which was based on a unique immature ♀ holotype from the Mountain Province in northern Luzon in the collection of ANSP. Thus, the ♀ at hand from the authors collection are the first adult specimens to become known of *O. uichancoi*, are illustrated herein and add precious new records. These nine ♀ show little variability with the specimens from the Ifuago Province being slightly larger on average. Slight variation is only seen in the size of the median mesonotals, which are somewhat more pronounced in the examples from Bay-Yo village, Mountain Province. Body length of these ♀ is 85.5-100.0 mm. The ♂ and eggs remain as yet unknown.

Distribution. – North Luzon: Mountain Province (Apayao, Ripang 17°48'N 121°90'E [ANSP – type.locality]; Bay-Yo village, 1200 m [FH; RBINS]); Province Ifuago, Central Cordillera (Mayoyao, *ca.* 450 m [FH]; Banaue, Kinakin, 1300 m [FH, RBINS]); Laguna Province (Los Baños [ANSP]. South Luzon: Province Quezon (San Narciso Municipality, Binay [ANSP]).

Stenobrimus Redtenbacher, 1906

Differentiation. – This genus is well recognized among Obriminae by a number of characters, why Hennemann et al. (2016: 17) placed it in a generic group on its own, the *Stenobrimus*-group. It can be differentiated from all other genera of Obriminae by the very slender body and legs, distinctive body armature, which includes simple paired posterior mesonotal and metanotal spines, lack of any composite spines or armature and presence of a distinct spine at the posterolateral angle of abdominal terga II-VI, very long and filiform antennae, which have the median antennomeres in particular extremely elongated, wholly unarmed tibiae, as well as the short ovipositor of ♀ in which the epiproct is shorter than the anal segment and the apex of the subgenital plate multi-dentate (Fig. 45G). The slender body, body supination, morphology of the antennae and multi-dentate apex of the subgenital plate are unique within the Obriminae. Moreover, the egg morphology readily characterizes *Stenobrimus*. The eggs have the capsule fairly short with the polar-area conically evaginated, posterolateral expansions of the micropylar very long and surrounding most of the capsule surface and the operculum inserted in the capsule at an angle of almost 45°. While a conically evaginated polar-area is also seen in the eggs of *Sungaya*. and the genus *Obrimus* Stål, 1875, the displaced operculum is unique within the entire subfamily Obriminae. The conically elevated back of the vertex and lack of invaginations on the metasternum is only shared with *Aretaon* Redtenbacher, 1906, *Trachyaretaon* Rehn & Rehn, 1939 and *Sungaya* Zompro, 1996, which suggests close relation to these three genera (Hennemann et al., 2016: 17).

Remarks. – Notes on the distribution and a key to the species of *Stenobrimus* were presented by Lit (2010), who first recorded the genus from the island of Mindanao and hypothesized that what may appear to be a disjunct distribution pattern rather reflects the still limited material available rather than events that could be associated with discontinuous distributions and relictual species. An updated key was provided by Eusebio, Lit & Lucañas (2023). The numerous

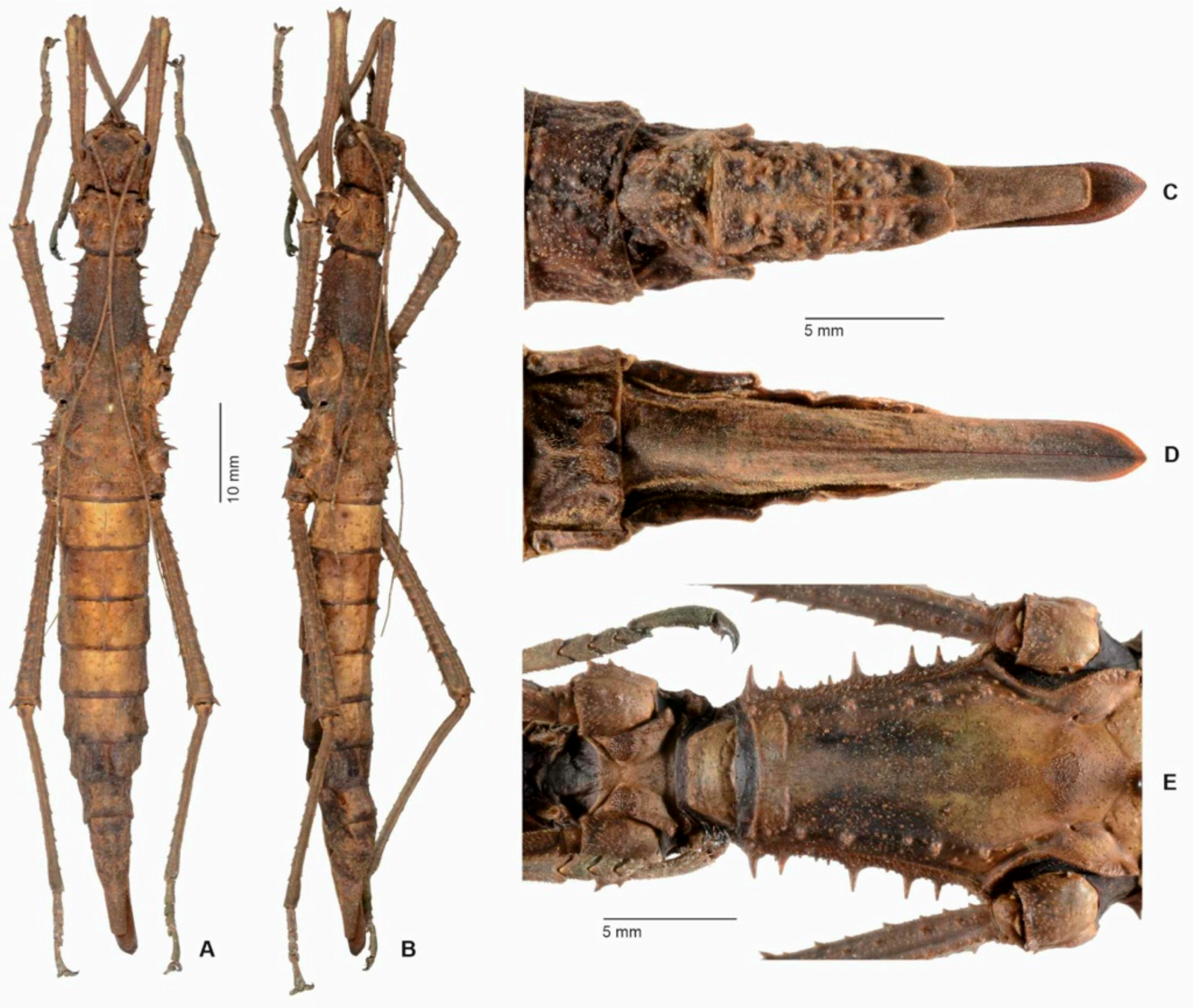

Fig. 43. *Obrimus uichancoi* Rehn & Rehn, 1939 ♀.

– **A**. Habitus dorsal view (N-Luzon, Ifuago Province, Mayoyao) [FH 1347-7]. – **B**. Habitus dorsolateral view (N-Luzon, Ifuago Province, Mayoyao) [FH 1347-7]. – **C**. Terminalia in dorsal view (N-Luzon, Mountain Province, Bay Yo) [FH 1347-1]. – **D**. Terminalia in ventral view (N-Luzon, Mountain Province, Bay Yo) [FH 1347-1]. – **E**. Mesosternum (N-Luzon, Ifuago Province, Mayoyao) [FH 1347-7].

citations of *Stenobrimus* may be referred to in the Phasmida Species File (http://Phasmida.SpeciesFile.org).

Distribution. – Philippines, endemic. So far recorded only from the islands of Luzon, Catanduanes, Mindanao and Polillo.

Species included

1. ***Stenobrimus bolivari*** Redtenbacher, 1906: 37, pl. 1: 1.
Distribution: Luzon & Catanduanes.

2. ***Stenobrimus lumad*** Lit & Eusebio, 2010: 4, figs.
Distribution: Mindanao.

3. ***Stenobrimus pilipinus*** Eusebio, Lit & Lucañas, 2023: 785, figs. 1, 5.
Distribution: Mindanao.

4. ***Obrimus tagalog*** Rehn & Rehn, 1939: 418, fig. 5, pl. 31: 11, 38:46.
Distribution: Polillo.

Stenobrimus bolivari Redtenbacher, 1906

(Fig. 45)

Stenobrimus bolivari Redtenbacher, 1906: 37, pl. 1: 1.

HT, ♀ (juvenile): Dolores, Tayabas, Mazarredo; *Stenobrimus bolivari* Redt.; Holotipo; MNCN, Cat. Tipos N° 7631 [MNMS].

- Bruner, 1915: 228.
- Rehn & Rehn, 1939: 416. (Redescription).
- Zompro, 1996b: 455, fig. 5 (♀, ♂).
- Zompro, 2004: 211, figs.
- Otte & Brock, 2005.
- Bresseel, 2009: 7. (Notes on rearing and description of egg).
- Bollens & Krijns, 2010: 10.
- Lit 2010: 2.
- Hennemann et al., 2016: 18, figs. 31-33, 54.
- Brock & Büscher, 2022: 521.

Material examined

1 ♀, **1** ♂: ex Zucht F. Hennemann 2009, Herkunft: Philippinen, Luzon Id., Quezon NP, leg. Bresseel et al. 2008 [FH, No's 0680-1 & 2];

7 ♀, **10** ♂, **2** ♂ (penultimate instar), 1 ♂ (n3): ex Zucht F. Hennemann 2009, Herkunft: Philippinen, Luzon Id., Quezon NP, leg. Bresseel et al. 2008 [FH, No's 0680-3 to 22];

1 ♀: Philippinen, Catanduanes Island, 1981 [FH, No. 0680-23];

2 ♀: Philippinen, S Luzon Island, Provinz Quezon, Tayabas, Mount Banahao, local collector II.2011 [coll. FH, No's 0680-24 & 25];

3 ♀, **2** ♂: Philippinen, S Luzon Id., Bicol Region, Provinz Albay, Mount Mayon Volcano, Tabaco, local collector II.2011 [FH, No's 0680-26 to 33];

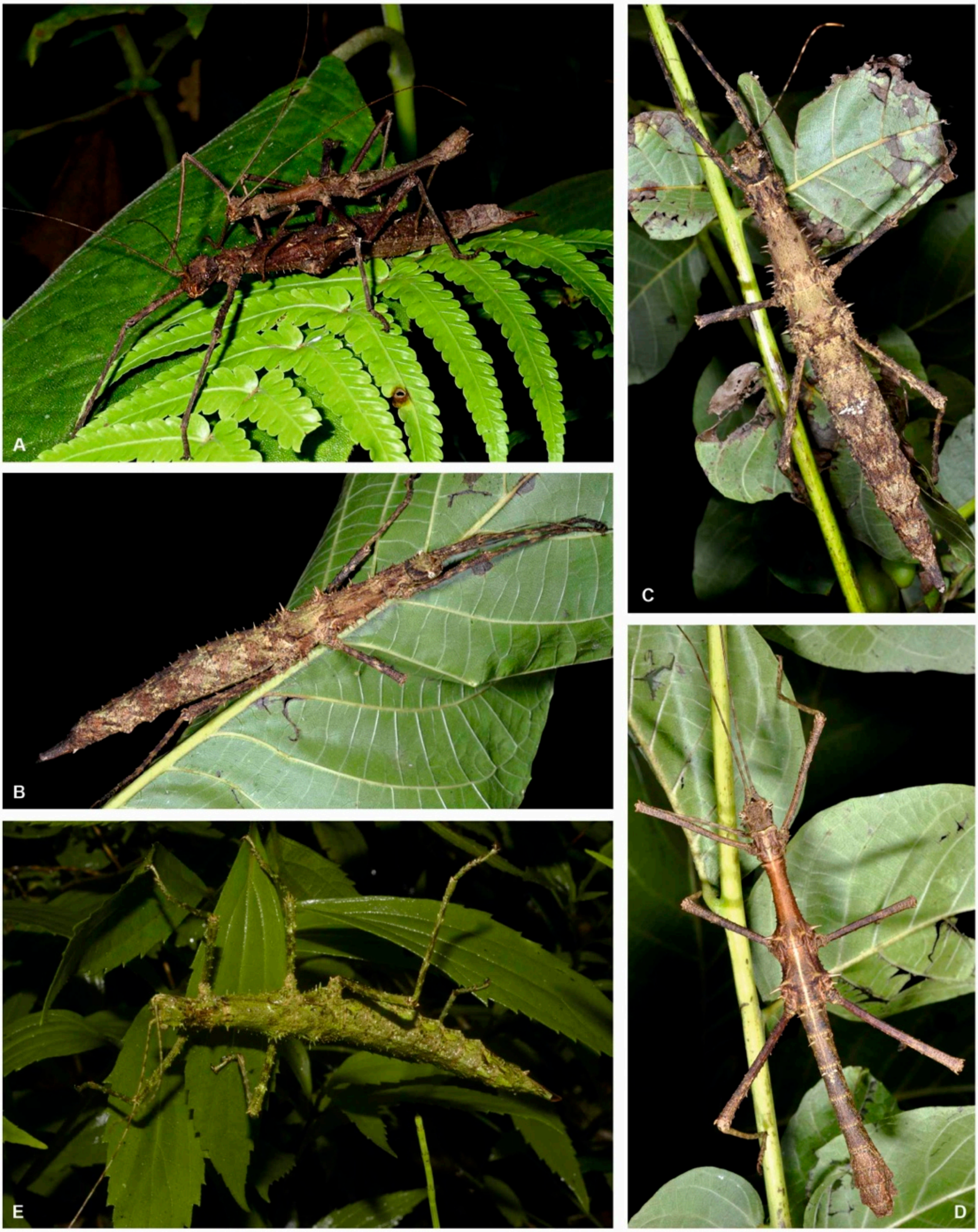

Fig. 44. *Obrimus* spp. Live insects.

– **A**. *O. bicolanus* Rehn & Rehn, 1939 couple (S-Luzon, Albay Province, Guinobatan) [© Albert Kang, https://www.inaturalist.org/observations/57705545]. – **B**. *O. bicolanus* Rehn & Rehn, 1939 ♀ (reared from SE-Luzon, Sorsogon Province, Mount Pulog). – **C**. *O. bicolanus* Rehn & Rehn, 1939 ♀ (reared from SE-Luzon, Sorsogon Province, Mount Pulog). – **D**. *O. bicolanus* Rehn & Rehn, 1939 ♂ (reared from SE-Luzon, Sorsogon Province, Mount Pulog). – **E**. *O. uichancoi* Rehn & Rehn, 1939 ♀ (N-Luzon, Ifuago Province, Banaue) [© Albert Kang, https://www.inaturalist.org/observations/57611226].

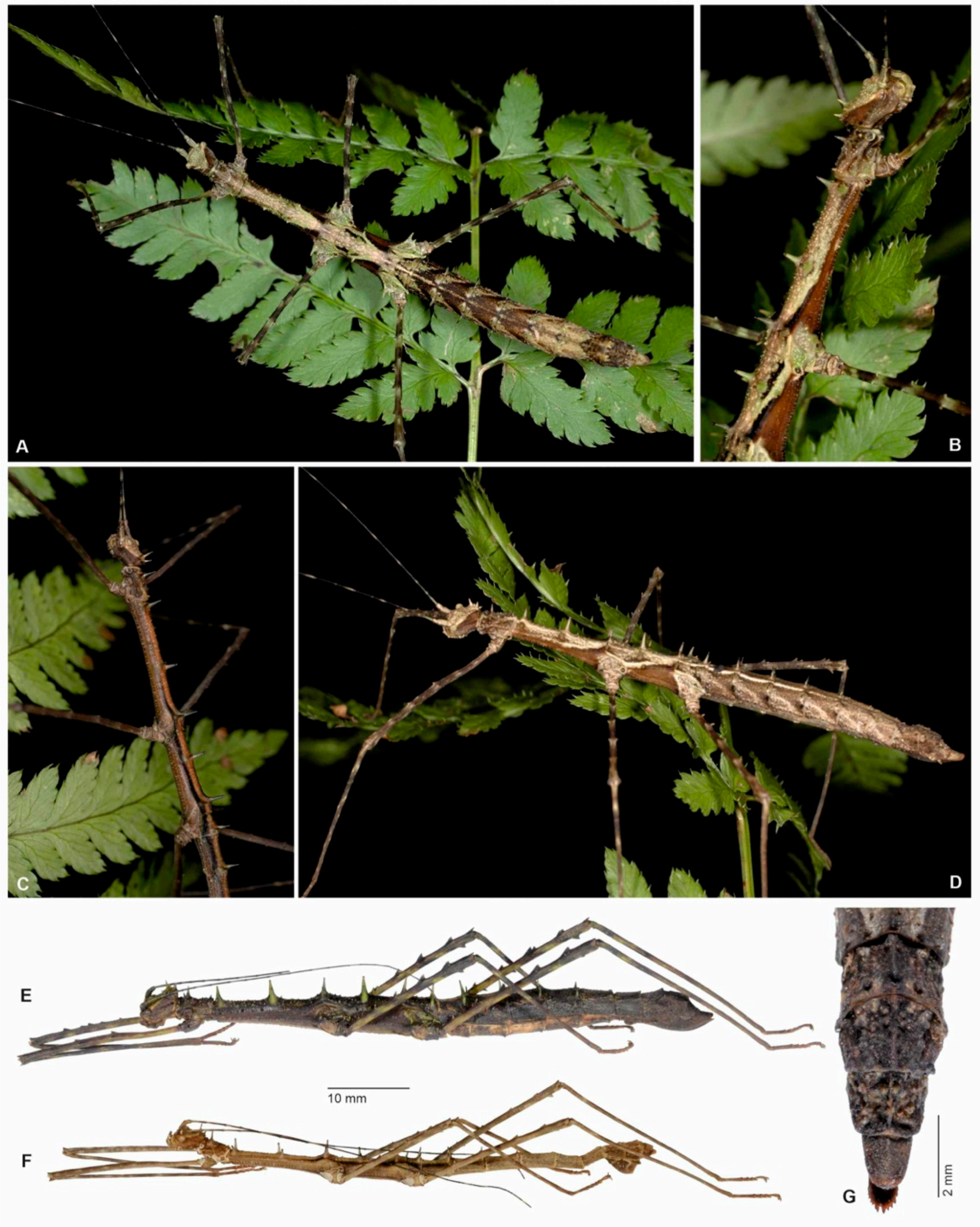

Fig. **45**. *Stenobrimus bolivari* Redtenbacher, 1906 Cative reared from Luzon, Quezon Province, Quezon N.P. – **A**. Live ♀ with contrasty colouration. – **B**. Closeup of head and thorax of live ♀ shown in A. – **C**. Head and thorax of live ♂. – **D**. Brown variety ♀. – **E**. ♀ habitus in lateral view [FH 0680-4]. – **F**. ♂ habitus in lateral view [FH 0680-13]. – **G**. Terminalia of ♀in dorsal view showing the multi-dentate apex of the subgenital plate [FH 0680-4].

1 ♂: Philippinen, S Luzon Id., Bicol Region, Prov. Camarines Sur, Lagonoy, I.2012 [FH, No. 0680-34];

1 ♀, **1** ♂, **1** egg: Philippinen, S Luzon Id., Bicol Region, Provinz Camarines Sur, Lagonoy [FH, No's 0680-35, 36 & E2].

Remarks. – This species is not uncommon in the southern Luzon and appears to be mostly restricted to moist mountainous habitats. They are almost exclusively found on ferns (Polypodiaceae) and low-growing members of the clubmoss family (Lycopodiaceae), which represent their natural host-plants (Zompro, 1996b: 455). Bresseel (2009) provided information on the captive breeding of this species and presented brief descriptions of both sexes and the eggs.

The specimens at hand show notable variability in colouration as well as the armature of the head, body and limbs, which was confirmed by captive breeding of stock originating from Quezon National Park (Fig. 45A-D). Variability although is more pronounced in ♀, which range in general colour from drab over ochre and various tones of brown and more rarely may have greenish hues. About one-third of the specimens have a straw-coloured medio-longitudinal streak running along the dorsal body surface, which usually terminates on abdominal tergum IV or V. The sometimes rather lichenose colour pattern provides good camouflage (Fig. 45A). Nymphs are mostly various shades of green throughout their development. The mesonotum mostly bears a single pair of distinct median mesonotals but the unique specimen available from Catanduanes has an additional pair of medio-lateral mesonotals, that are just slightly shorter than the median mesonotals. In all other aspects however, the specimen agrees well with the numerous examples from Luzon, which rarely exhibit very small medio-lateral mesonotals. Body lengths: ♀ 63.0-74.0 mm, ♂ 52.0-63.5 mm.

Distribution. – S-Luzon, Bicol Region: Province Quezon (Mt. Cristobal, Tayabas, Mazarredo, Dolores [MNMS – type-locality]; Mount Banahao, Tayabas [FH]; Mount Banahao, Alitao River, 600 m [OZ]; north-west of Tayabas 975 m [ANSP]; Quezon National Park [FH]); Province Albay (Mount Mayon, Tabaco [FH]); Province Camarines Sur (Lagonoy [FH]); Province Laguna (Majayjay [USNM]; Ube [USNM]). Catanduanes Island [FH].

Genus ***Sungaya*** Zompro, 1996

Differentiation. – This genus is most closely related and morphologically most similar to *Trachyaretaon*, with which it shares the inflated and conically raised vertex and lack of metasternal pseudo-foramina (Fig. 71H-L). The most notable difference between *Sungaya* and *Trachyaretaon* is represented by the egg morphology, with eggs of *Sungaya* being much more rounded and globose with the polar area obtusely protruded and the anterior portion of the capsule constricted, thereby resembling the eggs of *Obrimus* (Fig. 73R-U). The insects are morphologically difficult to separate but both sexes of *Sungaya* may be recognised by their generally slenderer shape and relatively longer body segments, comparatively longer mesothorax (> 2.5x longer than prothorax in ♂), which in ♀ is less distinctly trapezoidal in dorsal aspect than in *Trachyaretaon* and has the widened posterior portion at best 2x wider than the anterior margin, as well as the lack of a pair of medials on the metanotum and comparatively longer and more delicate limbs. Females also have the ovipositor rather straight in lateral aspect, while it usually is ± up-curved in *Trachyaretaon*.

Remarks. – Originally, the genus was described from the ♀ and egg only (Zompro, 1996). The ♂ was described by Lit & Eusebio (2008) based on specimens from Mount Cayapo, Bataan Province that were thought to represent the type-species *S. inexpectata*. Subsequently, specimens of *Sungaya* were collected from different localities throughout the island of Luzon and sampled in a molecular approach that aimed to clarify relationships within Obriminae (Bank *et al.*, 2021). This study has shown that there were at least three distinct species within *Sungaya* and that the ♂ described as that of *S. inexpectata* by Lit & Eusebio (2008) and referred to as *Sungaya* sp. 2 (Limay "Lowland") by Bank *et al.* (2021) was not conspecific with *inexpectata* but likely to represent a fourth species that might be the sister species of what is here described as *S. aeta* **n. sp.**. Morphological re-examination of the different populations of *Sungaya* support the aforementioned molecular data with the result that three new species are described herein. This however excludes the specimens from Mount Cayapo, Bataan Province described by Lit & Eusebio (2008) because these were not available for examination. There seems to be another as yet undescribed species from Baguio, Benguet Province, of which pictures have been shown in the internet by Adryn Nebrida, which is notably stockier than all other known species and has quite strongly developed cephalic, thoracic and abdominal armature. It is believed that a formal description is in progress. Dräger (2013) presented information on the culture history, captive breeding and intraspecific variability. The numerous citations of *Sungaya* may be referred to in the Phasmida Species File (http://Phasmida.SpeciesFile.org).

Distribution. – Philippines, endemic. So far recorded only from Luzon and believed to be endemic on that island.

Species included

1. ***Sungaya aeta*** **n. sp.**
Distribution: Luzon.

2. ***Sungaya dumagat*** **n. sp.**
Distribution: Luzon.

3. ***Sungaya ibaloi*** **n. sp.**
Distribution: Luzon.

4. ***Sungaya inexpectata*** Zompro, 1996: 450, figs. 1-3.
Distribution: Luzon.

Sungaya aeta **n. sp.**

(Fig. 46-49, 71L, 72P & 73R-S)

ZooBank: https://zoobank.org/D37B64B4-3985-45B6-8DEB-9AB2FACDB329

HT, ♀: Philippines, NW-Luzon, Bataan Prov., Ilanin Forest, alt. 100-250m, June 2008 [RBINS].

PT, **4** ♀, **5** ♂, **3** eggs: Philippines, NW-Luzon, Bataan Prov., Ilanin Forest, alt. 100-250m, June 2008 [RBINS].

PT, **6** ♀, **6** ♂: Philippines, Luzon, Subic, Ilanin forest, ex breeding J. Bresseel 2015 [RBINS].

PT, **1** ♀, **1** ♂, **1** egg: Philippines, NW-Luzon, Bataan Prov., Ilanin Forest, alt. 100-250m, June 2008 [FH, No's 1455-1, 2 & E].

PT, **5** ♀: ex Zucht: Rob Krijns 2009, F1 Generation, Herkunft: Philippinen, Luzon, Bataan Prov., Ilanin Forest 100-250 m [coll. FH, No's 1455-3 to 7].

PT, **9** ♀, **8** ♂: ex Zucht: Frank Hennemann 2010, F2 Generation, Herkunft: Philippinen, Luzon, Bataan Prov., Ilanin Forest 100-250 m [coll. FH, No's 1455-8 to 24].

Differentiation. – Females of this new species most closely resemble those of *S. ibalaoi* **n. sp.** but may best be separated by the shape of the praeopercular organ (Fig. 47E), which is formed by a distinct, almost semi-circular median excavation at posterior margin of sternum VII (small, shallow and with a pair of tubercles in *ibaloi*), the somewhat more distinct median indention of the anal segment (Fig. 47D) and on average more pronounced medials of the mesonotum, which however are variably in number and size (Fig. 47A-B). Moreover, ♀ of *aeta* have all the limbs comparatively stockier. From ♀ of the type-species *S. inexpectata* these ♀ may be distinguished by the stockier shape and notably stockier and relatively shorter legs, presence of enlarged mesonotals and semi-circular instead of triangular posteromedian excavation od abdominal sternum VII (Fig. 47E). Males can merely be differentiated from those of *S. ibaloi* **n. sp.** by the somewhat shorter mesothorax, which is only 2.6x longer than the prothorax (3x in *ibaloi*) and stronger terminal hook of the vomer, which has

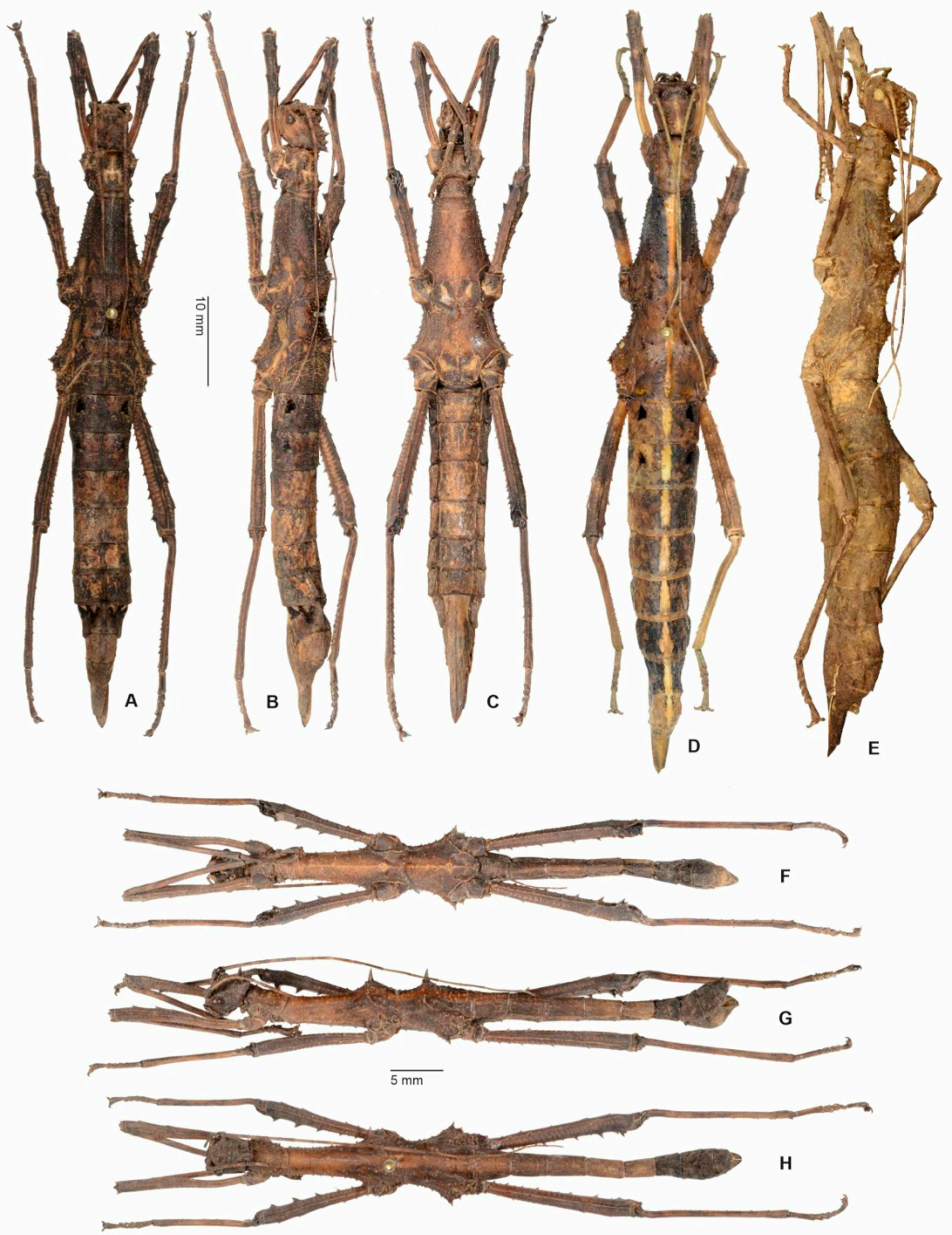

Fig. **46**. *Sungaya aeta* **n**. **sp**.

– **A**. ♀ holotype, dorsal view [RBINS]. – **B**. ♀ holotype, dorsolateral view [RBINS]. – **C**. ♀ holotype, ventral view [RBINS]. – **D**. ♀ paratype, dorsal view [FH 1455-3]. – **E**. ♀ paratype, dorsolateral view [FH 1455-4]. – **F**. ♂ paratype, dorsal view [RBINS]. – **G**. ♂ paratype, dorsolateral view [RBINS]. – **H**. ♂ paratype, ventral view [RBINS].

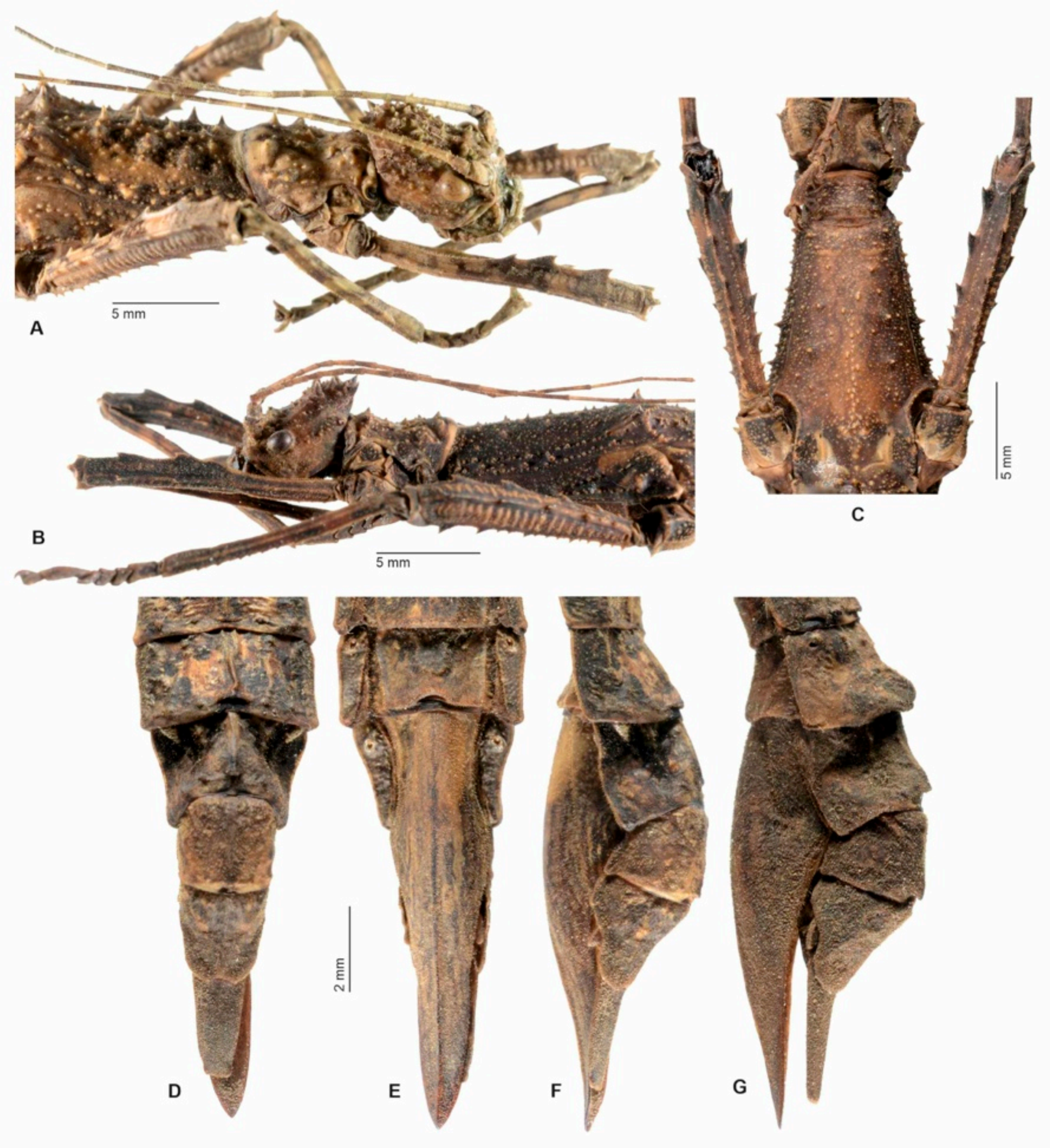

Fig. **47**. *Sungaya aeta* **n**. **sp**. ♀.

– **A**. Head, pro- and mesothorax of ♀ paratype with strongly developed mesonotal medials, dorsolateral view (captive reared from Lamao Forest reserve, Bataan Province, Luzon) [FH 1455-5]. – **B**. Head, pro- and mesothorax of ♀ holotype with weakly developed mesonotal medials, dorsolateral view [RBINS]. – **C**. Mesosternum of ♀ holotype, ventral view [RBINS]. – **D**. Terminalia of ♀ holotype, dorsal view [RBINS]. – **E**. Terminalia of ♀ holotype, ventral view [RBINS]. – **F**. Terminalia of ♀ holotype, lateral view [RBINS]. – **G**. Terminalia of ♀ paratype with a large posteromedian lobe on terga VII and VIII, lateral view [RBINS].

the sinistral apical corner somewhat protruded and roundly angular (Fig. 72P). The eggs (Fig. 73R-S) represent the most reliable distinctive feature to separate this new species from *S. ibaloi* **n**. **sp**. or *S. inexpectata*. They clearly differ from those of *ibaloi* by lacking a posteroventral bump or angle of the capsule, larger micropylar plate, which has the lateral extensions slender and almost parallel-sided (expanded and broadly rounded apically in *ibaloi*), circular operculum (oval in *aeta*) and notably darker general colour. From those of *inexpectata* they can be distinguished by the larger dimensions, less angular posteroventral region of the capsule, not indented polar protrusion and much broader and more expanded anterior end of the micropylar plate.

Etymology. – Named after the Aeta people, who live in various parts of the island of Luzon and are regarded as being among the earliest known migrants or inhabitants of the Philippines.

Description

In addition to the dried type-specimens, the colouration is described from live captive reared specimens and photos of live wild and captive reared specimens.

♀ (Fig. 46A-E)

Form and colouration. – Of average size (body length 71.0-84.0 mm) and shape for the genus with moderately developed body sculpturing and armature; body surface unevenly tuberculate. Colouration strongly variable and often complex in captive reared specimens (see notes on variability below) but the wild type specimens basically plain testaceous to dark drab. The holotype (Fig. 46A-C) with a roundish and velvety black lateral marking on abdominal terga II-IV, and a large irregularly shaped velvety black lateral marking on tergum VIII. The largest paratype with the posterior portion of the metanotum and metapleurae as well as the median segment greyish drab and abdominal terga IV-V light cream-coloured and another paratype with an ochre pre-apical marking on meso- and metafemora. Cephalic and thoracic tubercles mostly tipped with ochre.

Head. – Scarcely longer than wide, broadest at the eyes and with the vertex strongly tumescent and posteriorly somewhat projecting over anterior margin of pronotum (Fig. 47A-B); eyes projecting hemispherically and diameter of eye corresponding to 2x the length of gena. Frons somewhat inflated and with rather prominent conical supra-antennals, that are accompanied by some smaller tubercles anteriorly; the posterior portion of frons rather impressed; supra-orbital about equal in size to supra-antennal. Genae only set with a variable number of small gular tubercles. Anterior portion of vertex with a variable number of small occipital medials, the post posterior pair of which is strongly enlarged, prominent and rather spiniform; anterior pair of occipitals notably enlarged but somewhat smaller than the posterior occipital medials and about 2-3 smaller occipitals present in central portion of vertex. Median and lateral coronals large and largest elements of cephalic armature; the lateral coronals comparatively smaller than the median ones although. Antennae consisting of 26 joints and reaching to posterior margin of abdominal segment III; joints first gradually increasing and then decreasing in length towards tip of antennae; the median ones strongly elongated. Scapus compressed dorsoventrally and oval on outline with an obtuse medio-longitudinal carina dorsally.

Thorax. – Pronotum (Fig. 47A-B) relatively large, longer and wider than head, wider than long and with a distinct almost semi-circular pre-median excavation at lateral margins, the lateral margins notably deflexed in posterior half; transverse median sulcus moderately impressed, short and curved. Surface unevenly and sparsely tuberculate. Anterior margin only with a small median pair of tubercles and the antero-lateral pronotals very small. In anterior half with a prominent pair of obtuse, conical anterior pronotals and a small pair of medial pronotals present just in front of transverse sulcus; posterior portion with two somewhat pronounced pairs of conical medials, the posterior pair of which is comparatively larger and more spinose; posterior pronotals and inter-posteriors prominent and similar in size and shape. Mesothorax distinctly trapezoidal in dorsal aspect; mesonotum weakly narrowed anteriorly and parallel-sided in posterior two-thirds, about 2.4x longer than pronotum and about 2.15x longer than width at posterior margin. Surface of mesonotum unevenly tuberculate and with a row of somewhat enlarged but unequally sized tubercles along lateral margins and the pre-medians, medians and post-medians more or less enlarged and unequal in size; the posterior mesonotals rather low but composite and with an arched lateral ridge that is covered with rather node-like tubercles (Fig. 47A-B). Mesopleurae with a marginal row of unequally sized tubercles, the antero-, medio-lateral and two supra-coxals slightly enlarged; mesopleural obtusely conical and moderately sized. Metanotum somewhat narrowed towards the anterior with the posterior margin widely concave; one or two median pairs of tubercles slightly more pronounced and the posterior metanotals notably larger than the posterior mesonotals with the central tubercle distinctly spiniform and the lateral ridge more pronounced. Metapleurae with about seven blunt laterals and some smaller tubercles in between; the median supra-coxal indistinct and the metapleural composite but small. Both, meso- and metapleurae with a further row of small tubercles along lower margin. Meso- and metasternum (Fig. 47C, 71L) with a fine but distinct medio-longitudinal carina that is densely set with shiny node-like tubercles (this keel and tubercles gradually disappearing in anterior half of mesosternum); otherwise set with a few rather low tubercles, which are unequal in size and somewhat more pronounced on mesosternum.

Abdomen. – Median segment about 2x wider than long with anterior margin widely rounded; near posterior margin with five short posterior spines. Segments II-V almost uniform in length and width and on average 1.2x wider than long (III-V usually somewhat inflated in specimens that are in full egg-production), only VI-VII somewhat decreasing in length and width. Terga II-VII with all of the typical elements of armature only represented by small tubercles, the five posteriors somewhat more pronounced although; these terga also with a fine but acute medio-longitudinal carina, that becomes increasingly more pronounced towards VII where it may occasionally be protruded into a small, rounded posteromedian lobe (Fig. 47G). Sterna II-IV with a fairly strong anterior pair of spines and a notably smaller pair of posterior tubercles; the posterior pair indistinct on V-VII. Praeopercular organ formed by a broad and almost semi-circular median excavation at posterior margin of sternum VII, whose margin is notably inflated and down-folded (Fig. 47E). Terga VIII and IX with the medio-longitudinal carina obtuse and often protruded into an obtuse and low dentiform posterior projection; VIII notably longer than wide and narrowing towards the posterior, IX subquadrate in dorsal aspect. Anal segment narrowing posteriorly, descendant and obtusely tectate medio-longitudinally; the posterior margin with a distinct concave median excavation and the outer angles rather obtuse (Fig. 47D); lateral margins concave medially. Cerci small, narrowing and compressed laterally (Fig. 47F-G). Epiproct about as long as anal segment, broad, weakly tectate longitudinally and just weakly narrowing towards a broadly angular apex (Fig. 47E). Subgenital plate moderately long, lanceolate and distinctly keeled in the apical half; the apex gradually narrowed, pointed and slightly surpassing tip of epiproct (Fig. 47D-G).

Legs. – Of moderate length and rather stocky for the genus with all carinae armed except for the dorsal carinae of the tibia. Ventral carinae of tibiae only with small dentations, although those of the metatibiae are more numerous, notably more pronounced and acutely pointed. Basal flexure and constriction of profemora well developed, the two anterior carinae each with three large, triangular teeth (the first one notably smaller than the two apical ones); the two posterior carinae with five teeth that strongly decrease in size towards the base of femur and the dorsal ones of which are comparatively larger. Exterior ventral carinae of meso- and metafemora basically with about six acute teeth that increase in size towards the apex of femur; the two dorsal carinae with about five much broader teeth; several smaller intercalated teeth present on ventral carinae, especially on metafemora. Medioventral carina of meso- and metafemora moderate and irregularly granular (Fig. 47C). Tarsi about half as long as corresponding tibia; basitarsi elongate almost as long as proceeding three tarsomeres taken together.

♂ (Fig. 46F-G)

Form and colouration. – Size and shape typical for the genus (body length 51.0-61.5 mm) with sparse body armature but distinct and spinose posterior meso- and metanotals. Body surface minutely granular and unevenly tuberculate. Colouration variable in captive reared specimens but much less than ♀ although. The wild examples rather uniformly testaceous brown (Fig. 46F-H) and all with a ± distinct ochre medio-longitudinal dorsal streak on thorax (Fig. 49D). Median portions of meso- and metasternum reddish ochre (Fig. 48G).

Head. – Basically, as in ♀ but the vertex more strongly tumescent and all of the main elements of armature comparatively larger, but otherwise with notably less smaller tubercles; the supra-antennals simple and much smaller and the gulars indistinct or wanting (Fig. 48F, H). Antennae as in ♀ but relatively longer and reaching to posterior margin of abdominal segment IV.

Thorax. – Pronotum as in ♀ but all spines notably more pronounced and spiniform, the posterior in particular represented by large upright spines; only the inter-posterior pair smaller than in ♀ (Fig. 48F, H). Mesothorax slender, more or less uniform in diameter and notably swollen posteriorly (Fig. 48F); about 2.6x longer than prothorax. Mesonotum weakly widened anteriorly and posteriorly and 4.3x longer than width in median portion; surface sparsely and minutely tuberculate and only with a few somewhat enlarged tubercles (in posterior portion in particular) as well as a small and spiniform pair of anterior mesonotals; the posterior mesonotals represented by a pair of strong, upright spines that have some small tubercles around the base (Fig. 48F). Metanotum distinctly narrowed in anterior half; tubercles somewhat more pronounced than on mesonotum but the posterior metanotals roughly identical in size and shape to posterior mesonotals. Meso- and metapleurae strongly deflexed posteriorly and only with about five slightly enlarged, obtuse tubercles; two supra-coxals of metapleurae strongly enlarged and spiniform; the meso- and metapleural rather small and conical. Meso- and metasternum with a shallow medio-longitudinal carina that is marked by shiny, node-like tubercles that are clustered along the mid line; these forming a rounded wart-like cluster pre-posteriorly; otherwise sparsely set with some low tubercles (Fig. 48G).

Abdomen. – Notably narrower than thorax. Median segment with anterior margin convex and surface with some obtuse paired tubercles medially. Segments II-V roughly uniform in length, rectangular and about 2x longer than wide, II slightly shorter and narrowing towards the posterior; VI noticeably shorter than preceding and VII scarcely more than half the length of III-V and slightly widening towards posterior. All with surface merely supplied with some paired granules or nodes as well as a small but spiniform pair of second paired posteriors, which are distinct on II and III but become increasingly indistinct towards VII. Sterna II-VII with a fine medio-longitudinal carina; II with a pair of anterior and posterior pair of

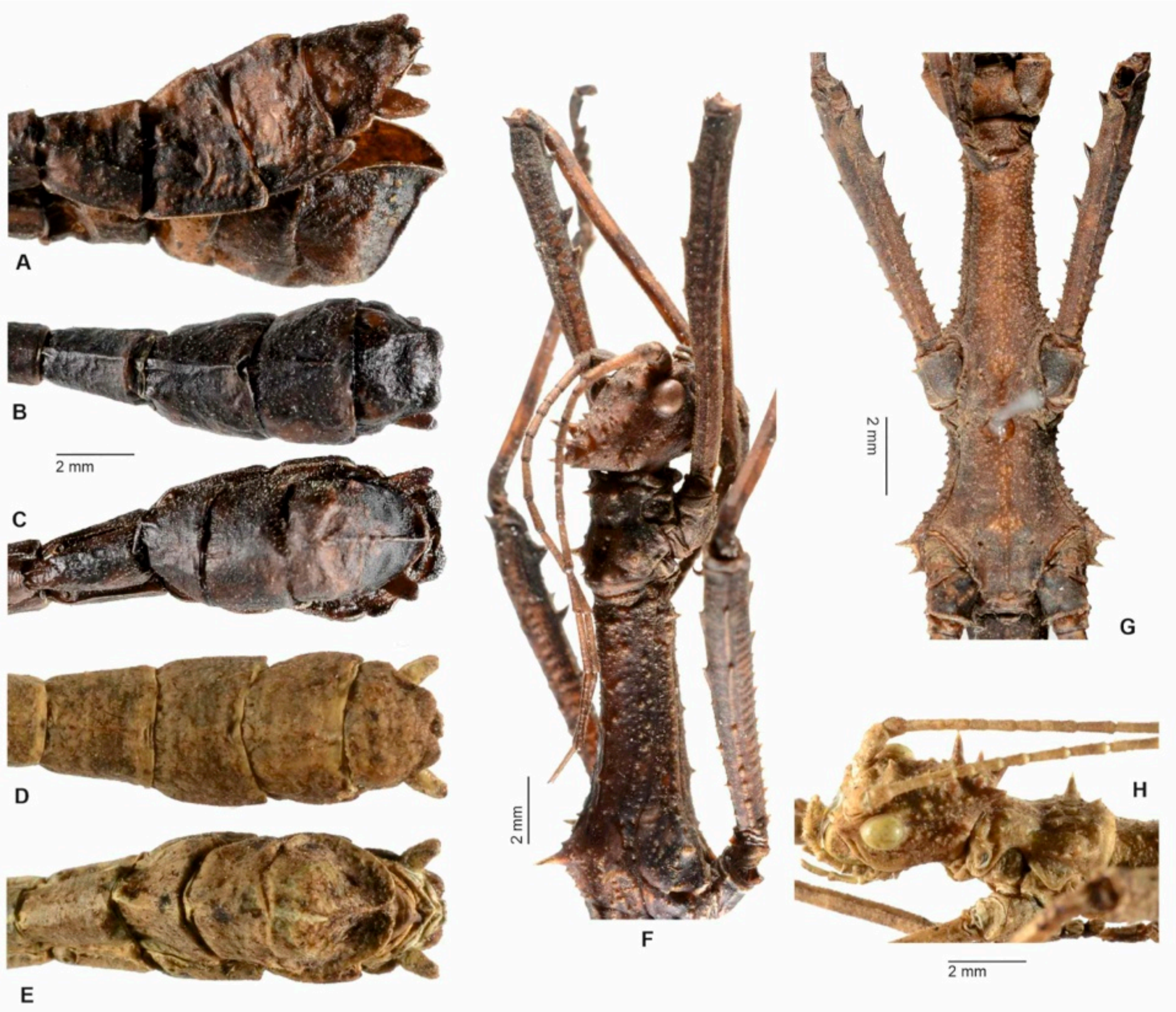

Fig. **48**. *Sungaya aeta* **n**. **sp**. ♂.

– **A**. Terminalia of ♂ paratype, lateral view [RBINS]. – **B**. Terminalia of ♂ paratype, dorsal view [RBINS]. – **C**. Terminalia of ♂ paratype, ventral view [RBINS]. – **D**. Terminalia of ♂ paratype, dorsal view (captive reared from Lamao Forest reserve, Bataan Province, Luzon) [FH 1455-17]. – **E**. Terminalia of ♂ paratype, ventral view (captive reared from Lamao Forest reserve, Bataan Province, Luzon) [FH 1455-19]. – **F**. Head, pro- and mesothorax of ♂ paratype in dorsolateral view [RBINS]. – **G**. Meso- and metasternum of ♂ paratype [RBINS]. – **H**. Head, and prothorax of ♂ paratype in dorsolateral view (captive reared from Lamao Forest reserve, Bataan Province, Luzon) [FH 1455- 24].

	♀, **HT** [RBINS]	♂, **PT**	♀, **PT**
Body	76.0	51.0-61.5	71.0-84.0
Pronotum	5.1	3.4-3.7	4.6-5.4
Mesonotum	12.0	10.1-12.2	11.7-13.2
Metanotum	7.2	5.8-6.4	7.1-7.5
Median segment	3.9	2.3-2.7	3.8-4.0
Profemora	13.9	11.5-13.5	12.7-15.5
Mesofemora	12.4	10.3-11.8	11.5-13.4
Metafemora	16.4	13.4-16.0	16.3-18.8
Protibiae	14.7	11.8-14.0	13.2-16.3
Mesotibiae	12.3	10.0-12.2	10.8-14.1
Metatibia	18.0	13.9-17.2	16.5-20.2
Antennae	> 35.0	35.0-42.0	35.0-46.0

Table 5. Measurements of *Sungaya aeta* **n**. **sp**.

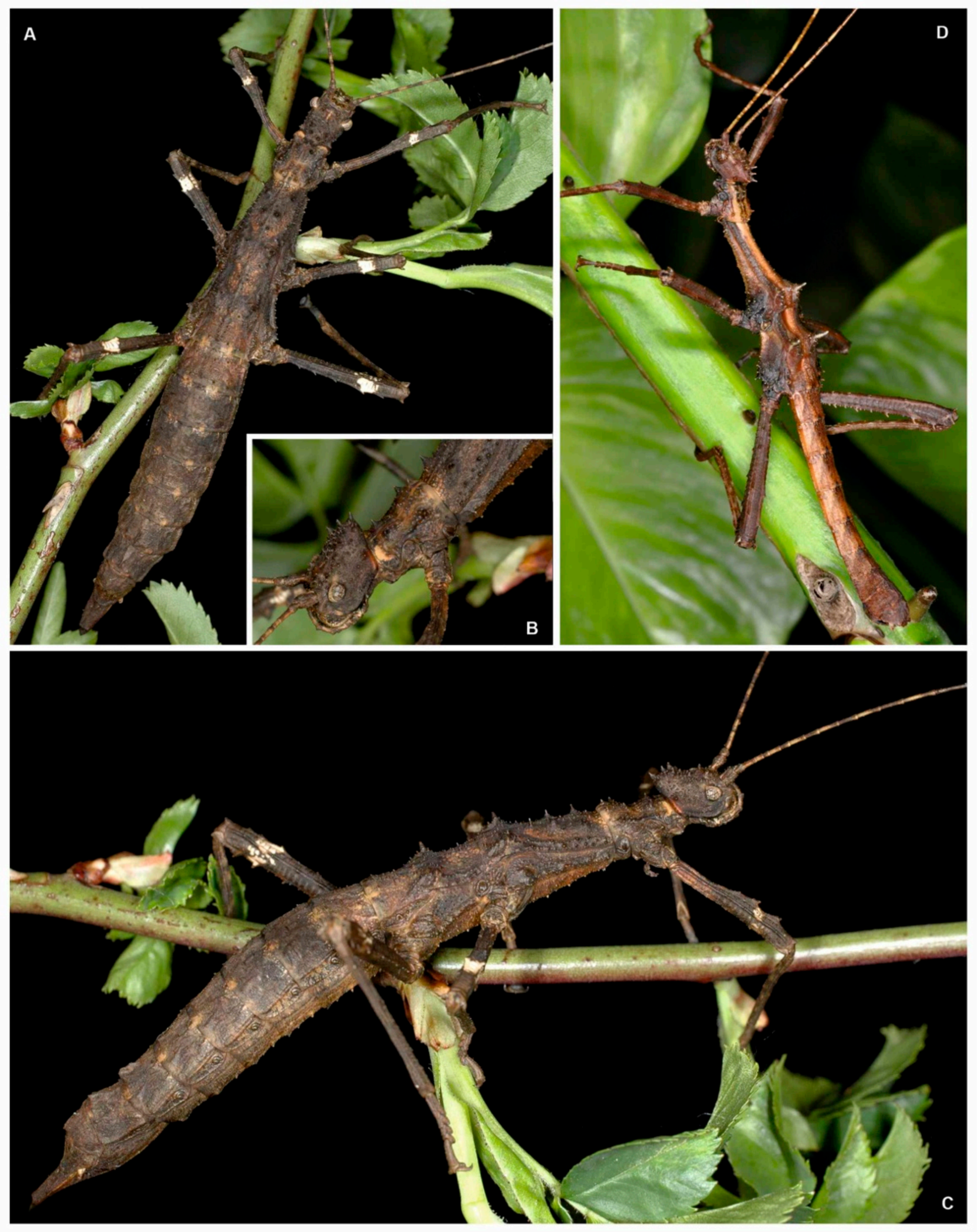

Fig. 49. *Sungaya aeta* **n**. **sp**. live F2-generation captive reared insects (paratypes).
– **A**. ♀ in dorsal view. – **B**. Closeup of head and prothorax of ♀ in A. – **C**. Lateral view of ♀ shown in A. – **D**. ♂ in lateral view.

short, rather obtuse spines, which are indistinct on III, almost wanting on IV and missing on V-VII. Terga VIII and IX broader and shorter than preceding, VIII trapezoidal and IX notably wider than long; both with the medio-longitudinal carina terminating in a low and obtuse, protrusion posteriorly; posterolateral angles of IX slightly deflexed. Anal segment notably longer than IX, declining and narrowed posteriorly, the posterior margin deeply indented medially and broadly bi-lobate; the rounded outer angles supplied with a few minute teeth ventrally (Fig. 48B, D). Epiproct fairly large, shield-shaped and projecting notably beyond posterior margin of anal segment (Fig. 48B, D). Cerci fairly large, compressed dorsoventrally and oval in outline. Vomer basically triangular in shape with the apex strong, acutely triangular and notably dextral directed (Fig. 72P). Poculum large, bulgy and cup-shaped (Fig. 48A) with the vertical posterior portion tectate and the posterior margin weakly bi-lobed (Fig. 48E, 72P), indented medially and notably projecting over base of anal segment.

Legs. – Long and slender, mesofemora longer than mesothorax and metatibiae projecting notably beyond apex of abdomen. Generally, as in ♀ but all teeth, but the ventral dorsal ones of the meso and metafemora much smaller and the ventral ones more spinose in shape. Ventral carinae of tibiae only with weakly indicated denticulations in apical portion. Tarsi much slenderer than in ♀ with basal joint notably longer than proceeding three tarsomeres taken together.

Variability. – Females of this species show some morphological variation but remarkable chromatic variability in particular. Morphologically, the variability mostly relates to the size and shape of the cephalic and thoracic armature and size as well as the shape of the posteromedian excrescence of abdominal tergum VII (Fig. 47F-G). The latter can be almost wholly wanting, or at the other extreme is represented by a fairly distinct, rounded lobe. Slightly variability is also seen on the posteromedian protrusion of tergum VIII, but this is much less than in VII. The thoracic elements of armature that show the most notable variability or the pre-median and median mesonotals (Fig. 47A-B). Considerable variability is seen in captive reared ♀, which range from plain buff to dark brown and almost black but may also be of very complex colour patterns that comprise various tones of black, brown, beige, white and green. The green morphs however seem to be caused by breeding conditions such as very high humidity and little or white light and have not yet been found in the wild. According to Dräger (2013: 5) the green colour in nymphs disappears after a few skin sheds if the humidity and lighting are changed. The black lateral markings on abdominal terga III, IV and VIII are variable in shape but are missing in about two-thirds of the specimens examined. Occasionally, specimens have a white to cream coloured medio-longitudinal streak along the dorsal body surface (Fig. 46D) and quite frequently there is an irregularly shaped whitish pre-apical transverse band on all femora (Fig. 49A, C). Specimens often have the posterior portion of the metanotum and metapleurae as well as the median segment pale cream in colour or abdominal terga V-VII partly to wholly whitish or cream in colour. Some specimens have the bases of all femora as well as the tibiae wholly cream-coloured. In the wild the dark coloured varieties are found close to the coast, whereas the white flecked varieties are only found in the inland forests (Dräger, 2013: 5; based on personal communication Thierry Heitzmann). Notably less variability is seen in ♂.

Egg (Fig. 73R-S)

Large and of typical shape for the genus; capsule bulgy, strongly constricted anteriorly and the polar area moderately constricted and obtusely conical with an obtuse central protrusion. Surface smooth and densely, minutely pitted. Micropylar plate weakly raised above capsule surface, sculptured like capsule; shape broadly and invertedly T-shaped with the median portion strongly broadened and rounded and the two lateral extensions rather narrow, parallel-sided, very weakly up-curved and reaching *ca.* 60% along lateral surfaces of capsule; posteromedian portion widely excavated and with a fairly distinct bowl-shaped micropylar cup. Outer margin of plate broad and inflated. Median line an obtuse bulge that reaches about half the way to pole of capsule. Operculum circular, flat and pitted like capsule with a very slight central protrusion; opercular angle *ca.* -5°. Colour dark grey; the outer margin of the micropylar plate, anterior margin and polar protrusion of capsule and the operculum blackish. Measurements [mm]: Length 4.8-4.9, width 3.4-3.5, height 3.7-3.8, length of micropylar plate 3.0.

Remarks. – The type specimens collected at Ilanin Forest, Morong Municipality, Bataan Province in June 2008 have given rise to a first culture, that is still successfully maintained throughout Europe. Culture stock from throughout the Bataan Province and referred to as “Lowland”, “Ilanin Forest” or “Limay Lowland” was introduced to Europe on several occasions, but these appear to have been crossbred (Dräger, 2013).

In captivity this species is very easy to rear in humid conditions and average temperatures of 22-27°C. Various plants are accepted as alternative food, including bramble and raspberry (*Rubus* spp., Rosaceae), roses (*Rosa* spp., Rosaceae), hazel (*Corylus avellana*, Betulaceae), hornbeam (*Carpinus betulus*, Betulaceae), beech (*Fagus sylvestris*, Fagaceae), oak (*Quercus robur*, Fagaceae) and ivy (*Hedera helix*, Araliaceae). As for all members of Obrimini a substrate is necessary to allow ♀ to lay their eggs.

Distribution. – Western Central Luzon, Bataan Province (lowland habitats).

***Sungaya dumagat* n. sp.**

(Fig. 50 & 71J)

ZooBank: https://zoobank.org/84FE7912-035B-493F-94FA-F8279CFC345E

HT, ♀: Philippines, N-Luzon, Prov. Nueva Vizcaya, Cagayan Valley, Aritao Mun., Balite, *ca.* 1100 m, leg. I.O. Lumawig VII.1996 [RBINS, ex coll. FH].

Differentiation. – The ♀ of this distinctive species (the only sex known), is easily separable from the other three know species in the genus by the densely tuberculose to spinulose body surface (Fig. 50B-C), large posteromedian crest of abdominal tergum VII (Fig. 50H), prominent and spiniform anterior and posterior pair of tubercles of the abdominal sterna (Fig. 50D) and deep triangular median excavation of the anal segment (Fig. 50F, a shallow emargination in all other species).

Etymology. – Named after the Dumagat people, who are a subgroup of the Aeta indigenous people, and inhabit the Aritao municipality of Nueva Vizcaya province, the type locality of this distinctive new species. Translated from Tagalog the name means “people from the sea” because in the past these people used to live in coastal areas of the Aurora and Quezon provinces.

Description

The colouration is described from the unique dried holotype. Both antennae are incomplete.

♀ (Fig. 50)

Form and colouration. – Small (body length 70.1 mm) and of average shape for the genus; all elements of head, body and leg armature well developed if compared to congenerics and body surface densely tuberculose to spinulose. Colour drab to dark ochraceous, the head and prothorax with a slight olive wash; cephalic and thoracic armature wholly olive, that of the abdomen dark orange ochraceous. Abdominal segment VI and VII dark brown in the holotype, which however may be an individual trait. Ventral body surface buff and unevenly flecked with brown. Legs irregularly mottled with drab, ochre and some olive. The antennae olive mid brown basally and gradually turning to orange-mid brown. Eyes dark ochraceous and flecked with darker brown.

Head. – As typical for the genus with the vertex notably inflated and roundly tumescent (Fig. 50E), scarcely longer than wide and broadest at the eyes; these large, projecting subhemispherically and diameter of eye corresponding to half the length of gena. Surface sparsely granular and minutely tuberculate; supra-antennals strong and upright spines with a much smaller pair of spiniform tubercles in front, the supra-orbitals spinose but notably smaller; the median and lateral coronals large and pointed spines. Supra-orbital series represented by

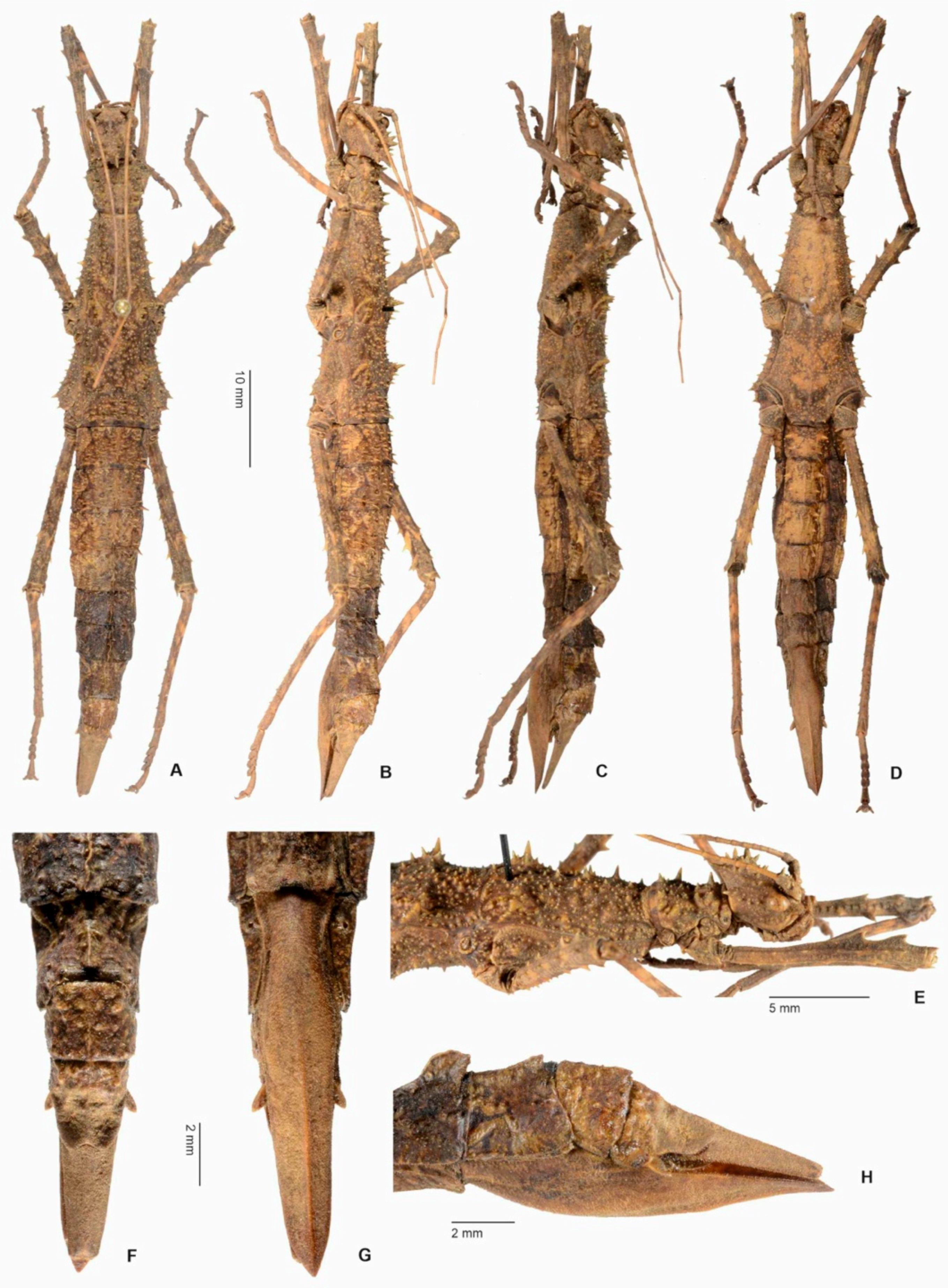

Fig. 50. *Sungaya dumagat* **n**. **sp**. ♀ holotype [RBINS].

– **A**. Habitus dorsal view. – **B**. Habitus dorsolateral view. – **C**. Habitus lateral view. – **D**. Habitus ventral view. – **E**. Head and thorax in dorsolateral view. – **F**. Terminalia in dorsal view. – **G**. Terminalia in ventral view. – **H**. Terminalia in lateral view.

about four rather small, spiniform tubercles; vertex armed with several variably sized occipital medial spines, a medio-lateral one of which is strongly enlarged and represents the largest of all cephalic spines (in the holotype, the dextral one bi-fid, which may however only be an individual trait). Antennae at least reaching to median segment but broken in the holotype; scapus moderately compressed dorso-ventrally and roundly rectangular in outline; pedicellus slightly shorter and almost round in cross-section; III much longer than pedicellus, the proceeding progressively elongated.

Thorax. – Pronotum of similar dimensions as head, longer than wide and somewhat narrowed in the anterior half; lateral margins with a distinct almost semi-circular pre-median excavation; the transverse median sulcus moderately impressed, gently angled and rather short; surface minutely and unevenly tuberculated. Anterior margin only with small mesals, the antero-lateral pronotals represented by rather small, conical tubercles; anterior portion with a strong and conical pair of anterior pronotals and a notably smaller pair of conical medial pronotals just in front of transverse sulcus; the posterior half with a large pair of spiniform lateral-medials, which represent the largest of al prothoracic spines; the inter-posterior pronotals distinct and spiniform, the posteriors somewhat smaller (Fig. 50E). Mesothorax slightly ascendant and widened towards the posterior, shape trapezoidal in outline with posterior margin about 2x wider than anterior margin; 2.6x longer than prothorax (Fig. 50A). Mesonotum just weakly narrowing towards the anterior, surface distinctly tuberculated; antero-lateral small but spiniform, a rather closely spaced pair of anterior mesonotals similar in size and shape; pre-medials displaced towards lateral margins and represented by fairly distinct spines; median mesonotals moderately enlarged and closely spaced; posterior mesonotals composite with numerous unequally sized spiniform tubercles to short spines around the base, the central spine very strong, upright and acutely pointed (Fig. 50E); inter-posterior mesonotals just weakly pronounced. Mesopleurae weakly deflexed and with about seven enlarged but unequal spiniform tubercles; mesopleural moderately sized, spiniform; surface otherwise unevenly tuberculated. Metanotum almost rectangular in outline and just very weakly narrowed anteriorly; roughly in centre with a pair of slightly enlarged conical tubercles; the posterior metanotals similar to those of the mesonotum (Fig. 50E). Metapleural similar to mesopleural, the pleurae unevenly multi-tuberculated and the margin with about five unequally sized lateral tubercles. Meso- and metasternum (Fig. 50D) with a shallow medio-longitudinal carina that is marked by some clustered node-like granules; surface otherwise unevenly granular and mesosternum with about six somewhat pronounced, conical mesosternals; metasternum only with two lateral tubercles and some scattered, unequally sized tubercles and nodes medially (Fig. 71J). Metabasisternum with four spiniform tubercles along posterior margin.

Abdomen. – Median segment 2.2x wider than long with anterior margin widely rounded; surface distinctly spinulose, the posterior margin with five short posterior spines. Segments II-V almost uniform in length and width and 1.7x wider than long, VI-VII somewhat decreasing in length and width. Terga II-VII multi-spinulose with the posteriors enlarged, but the second paired posteriors in particular, represented by long and slender, acutely pointed spines (these however less pronounced on VI and VII). These terga with a fine but acute medio-longitudinal carina, that becomes increasingly more pronounced and is protruded into a large, almost semi-circular and obtusely crenate posteromedian lobe on VII (Fig. 50H). Sterna II-IV with a strong anterior pair of spines and a notably smaller pair of posterior spines; the posterior wanting on V-VII. Praeopercular organ formed by a broad, somewhat angular median excavation of sternum VII, whose margin is notably inflated and glossy (Fig. 50G). Terga VIII and IX with the medio-longitudinal carina protruded into an obtuse and low dentiform posterior projection; VIII notably longer than wide and narrowing towards the posterior, IX subquadrate in dorsal aspect. Anal segment narrowing posteriorly, descendant and obtusely tectate medio-longitudinally; the posterior margin with a distinct triangular excavation and the outer angles rather obtuse (Fig. 50F). Cerci small, narrowing and compressed laterally. Epiproct 1.5x longer than anal segment, broad, distinctly tectate longitudinally and just weakly narrowing towards a broadly angular and weakly indented apex (Fig. 50F). Subgenital plate moderately long, lanceolate and distinctly keeled in the apical half (Fig. 50G); the apex narrowed, acutely triangular and very slightly surpassing tip of epiproct (Fig. 50F).

Legs. – Of moderate length and rather slender for the genus with all carinae armed except for the dorsal carinae of the tibia. Ventral carinae of tibiae only with small dentations, although those of the metatibiae are more numerous, notably more pronounced and acutely pointed. Basal flexure and constriction of profemora well developed, the two anterior carinae each with two large, triangular teeth; the two posterior carinae with five teeth that strongly decrease in size towards the base of femur. Exterior ventral carinae of meso- and metafemora with six and anterior carinae with five teeth that increase in size towards the apex of femur; several smaller intercalated teeth present. Medioventral carina of meso- and metafemora distinct and set with a row of small tubercles. Tarsi about half the length corresponding tibia; basitarsi elongate almost as long as proceeding three tarsomeres taken together.

Measurements [mm]. – Body 71.0, pronotum 5.1, mesonotum 11.0, metanotum 5.8, median segment 2.8, profemora 14.0, mesofemora 10.8, metafemora 16.6, protibiae 15.2, mesotibiae 12.8, metatibiae 18.5, antennae > 30.0.

Remarks. – Male and egg unknown.

Distribution. – N-Luzon, Province Nueva Vizcaya, Aritao municipality.

***Sungaya ibaloi* n. sp.**

(Fig. 51-53, 71K, 72Q & 73T-U)

ZooBank: https://zoobank.org/03B079A2-E629-4A9E-BEF1-8C01334C6D7A

HT, ♀: Philippines, N. Luzon, Benguet 900-1000 m asl, leg. Heitzmann 2013 [RBINS].

PT, ♂: Philippines, N. Luzon, Benguet 900-1000 m asl, leg. Heitzmann 2013 [RBINS].

PT, **2** ♀, **6** ♂, **1** egg: Philippines, N-Luzon, Prov. Benguet, 900-1000 m, leg. Heitzmann, ex breeding B. Kneubühler 2015 [RBINS].

PT, **1** ♀, **1** ♂, **1** egg: ex Zucht: B. Kneubühler 2015, Herkunft: Philippines, N-Luzon, Prov. Benguet, 900-1000 m, leg. Heitzmann [FH, No's 1456-1, 2 & E].

PT, **3** ♂: ex Zucht Eva Seidel-Hennemann 2016, Herkunft: Philippines, N-Luzon, Prov. Benguet, 900-1000 m, leg. Heitzmann [FH, No's 1456-3 to 5].

Differentiation. – Females of this new species most closely resemble those of *S. aeta* **n. sp.** and the type-species *S. inexpectatata*. From the latter these ♀ may be distinguished by stockier shape and comparatively stockier limbs as well as the small, rounded posteromedian indention of abdominal sternum VII (Fig. 51E), which bears two obtusely conical tubercles close to the posterior margin (a triangular excavation in *inexpectata*). From the very similar ♀ of *S. aeta* **n. sp.** they can best be separated by the shape of the praeopercular organ (Fig. 51E), which is formed by only a small posteromedian indention and a pair of tubercles near posterior margin of abdominal sternum VII (a large semi-circular median excavation in *aeta*), the less distinct median indention of the anal segment (Fig. 51D), lack of notably enlarged medials on the mesonotum (Fig. 51F), somewhat more raised and peg-like vertex (Fig. 51F) and comparatively slenderer limbs. Males are morphologically very difficult to differentiate and merely differ from those of *S. aeta* **n. sp.** by the comparatively more raised and peg-like vertex (Fig. 52L), somewhat longer mesothorax, which is 3x longer than the prothorax (only 2.6x in *aeta*) and evenly triangular vomer, which has the terminal point smaller than in *aeta* (Fig. 72Q). The eggs (Fig. 73T-U) readily differ from those of *aeta* by the characteristic additional posteroventral angle or bump of the capsule, smaller micropylar plate, which has the lateral extensions expanded and broadly rounded apically (rather slender and parallel-sided in *aeta*), oval operculum (circular in *aeta*) and somewhat lighter grey general colour. From the eggs of inexpectata these eggs may also be separated by the characteristic posteroventral hump of the capsule as well as the larger dimensions and more expanded apex of the lateral extensions of the micropylar plate.

Etymology. – Named after the Ibaloi people, an indigenous ethnic group that lives in Benguet Province of Luzon, the type-locality of this new species. Their name means “people who live in houses” and they are one of the indigenous peoples collectively known as Igorot, who live in the Central Cordillera of Luzon. They are well known for their mummification process of corpses and houses that are usually built on five footposts.

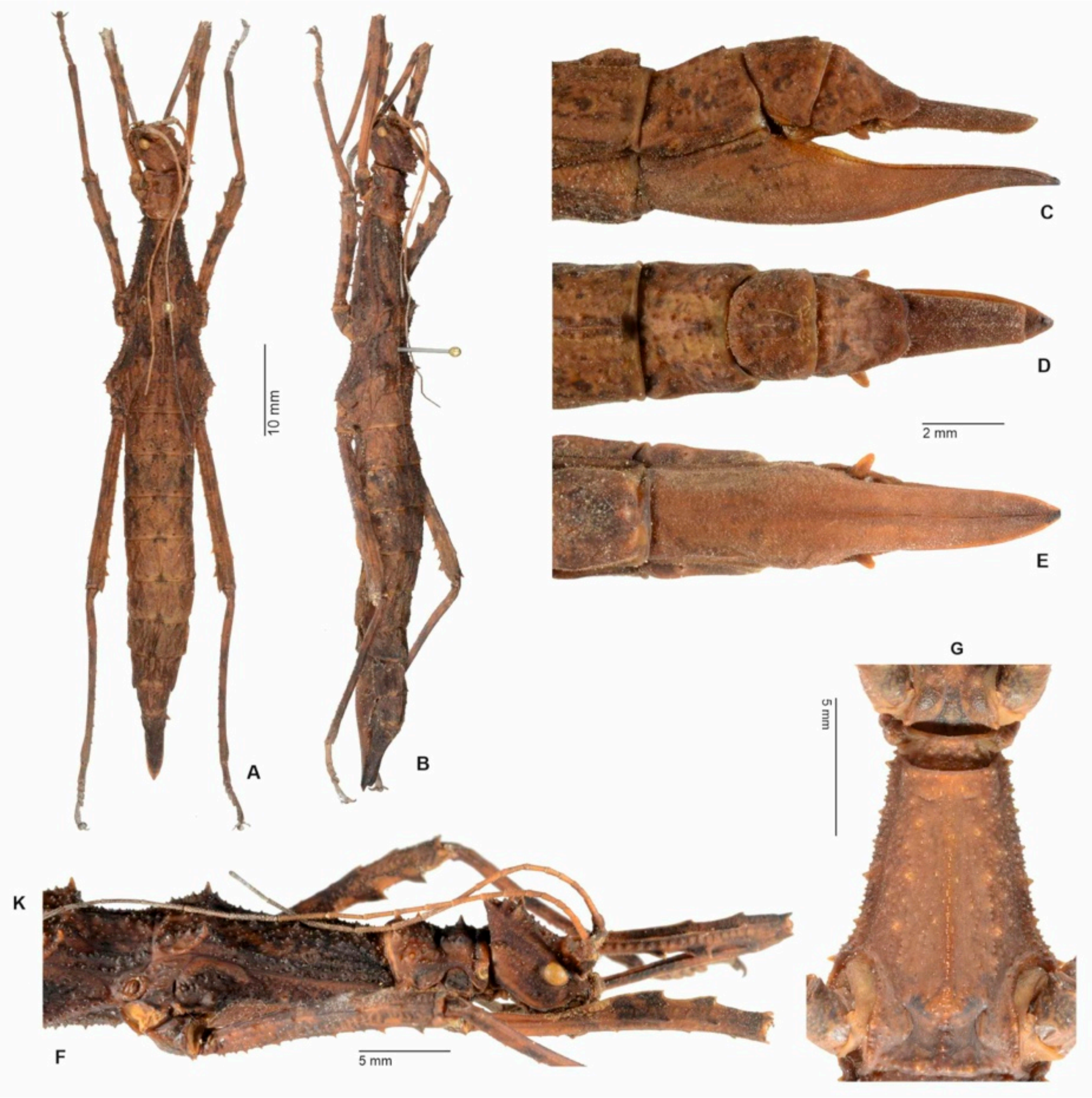

Fig. **51**. *Sungaya ibaloi* **n**. **sp**. ♀.

– **A**. Paratype, habitus dorsal view [RBINS]. – **B**. Paratype, habitus dorsolateral view [FH 1456-1]. – **C**. Terminalia of paratype in lateral view [RBINS]. – **D**. Terminalia of paratype in dorsal view [RBINS]. – **E**. Terminalia of paratype in ventral view [RBINS]. – **F**. Head and thorax of paratype in dorsolateral view [FH 1456-1]. – **G**. Mesosternum of paratype [RBINS].

Description & Variability

Since this new species morphologically almost wholly agrees with *S. aeta* **n**. **sp**., it appears fairly pointless to present a full description below, which would in most parts be nothing but a repetition. Therefore, only some important features and distinctive characters are summarized and highlighted below along with notes on the intraspecific variability. The colouration is described from live captive reared specimens and photos of live wild and captive reared specimens.

♀ (Fig. 51)

Of average size and shape for the genus (body length 72.1-85.0 mm) and morphologically very similar to *S. aeta* **n**. **sp**. from the Bataan province. Body unevenly tuberculate and granular and entire dorsal body surface with a fine medio-longitudinal carina; body armature weakly developed. Colouration less variable than in *aeta* and usually less complex with less white markings and more commonly specimens are irregularly striped longitudinally. Head with vertex on average somewhat more conical and peg-like in shape than in *aeta* and the median coronals and posterior pair of occipitals comparatively more pronounced (Fig. 51F). Antennae with 25 joints. Pronotum with the anterior pronotals strong, conical and the pair of medials just in front the of the distinctly impressed transverse median sulcus small but developed. Mesonotum rather short and merely 1.9x longer than width at posterior margin; only with a slightly enlarged pair of conical pre-median tubercles; otherwise without notably enlarged armature and the posterior mesonotals rather low, conical and surrounded by numerous small tubercles. Posterior metanotals also shorter and comparatively more obtuse than in *aeta* (Fig. 51F). All tubercles of the meso- and metapleurae rather uniform in size and only 6-7 very slightly more pronounced than the others; one of the supra-coxals notably enlarged but rather short and conical. Meso- and metasternum with a distinct, densely granular medio-longitudinal carina that forms a roundish cluster of granules pre-posteriorly (Fig. 51G, 71K). Abdominal segments II-VI almost uniform in length and on average 1.7x wider than long; VII shorter than preceding. Terga II-V with all elements of armature seen in *aeta* only represented by small tubercles and only the second paired posterior slightly more pronounced and spiniform; VI and VII without nodes or tubercles. The medio-longitudinal carina more or less protruded and crested posteriorly on tergum VII, and occasionally forming a rounded lobe (Fig. 51C). On VIII more or less obtusely protruded pre-posteriorly. Praeopercular organ formed by a small posteromedian indention that is laterally bordered by a tubercle close to posterior margin of abdominal sternum VII (Fig. 51E). Anal segment with

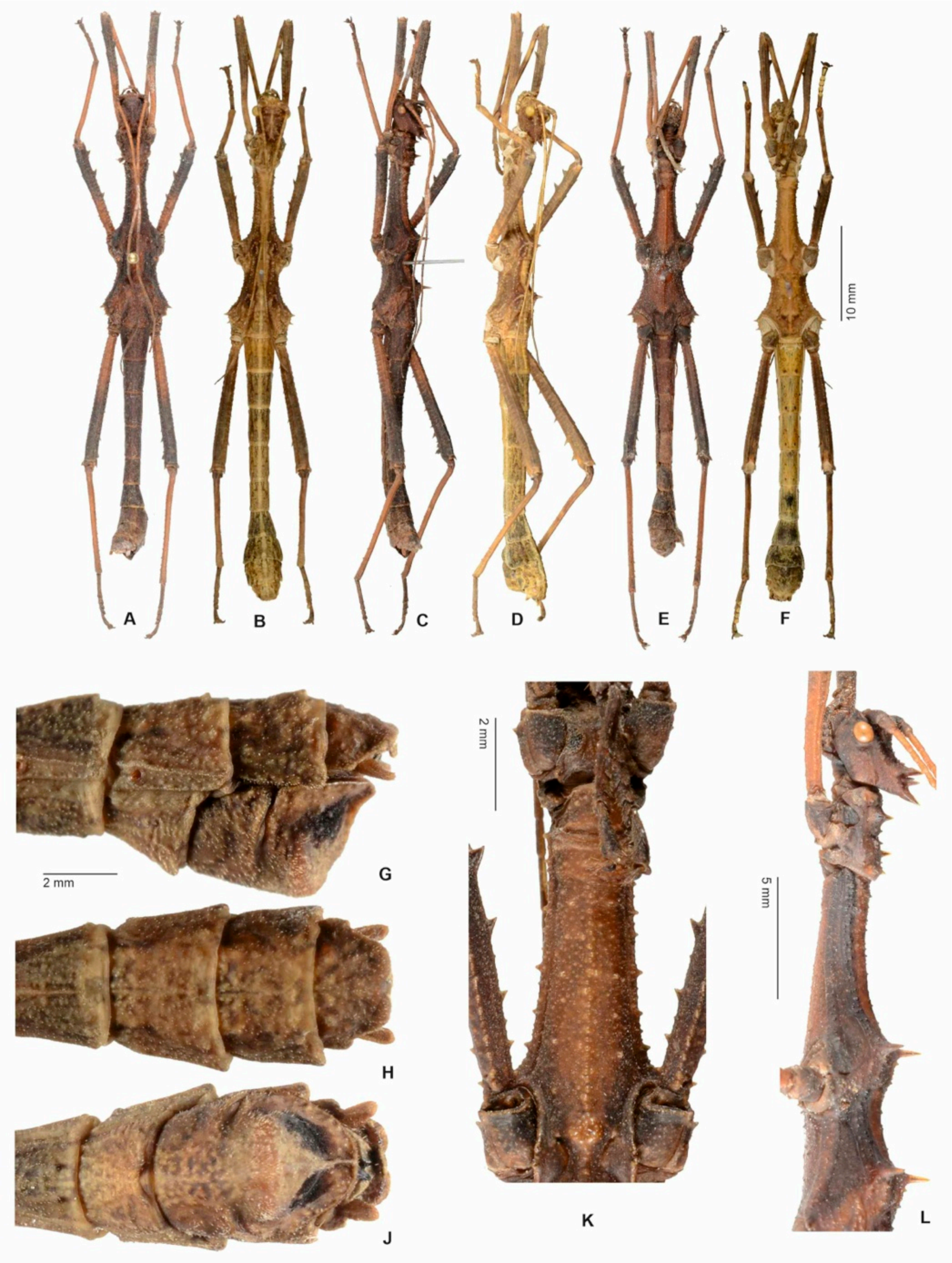

Fig. **52**. *Sungaya ibaloi* **n**. **sp**. ♂.

– **A**. Paratype, habitus dorsal view [FH 1456-2]. – **B**. Paratype, habitus dorsal view [FH 1456-3]. – **C**. Paratype, habitus dorsolateral view [FH 1456-2]. – **D**. Paratype, habitus dorsolateral view [FH 1456-3]. – **E**. Paratype, habitus ventral view [FH 1456-2]. – **F**. Paratype, habitus ventral view [FH 1456-3]. – **G**. Terminalia of paratype in lateral view [FH 1456-5]. – **H**. Terminalia of paratype in dorsal view [FH 1456-5]. – **J**. Terminalia of paratype in ventral view [FH 1456-5]. – **K**. Mesosternum of paratype [FH 1456-2]. – **L**. Head and thorax of paratype in lateral view [FH 1456-2].

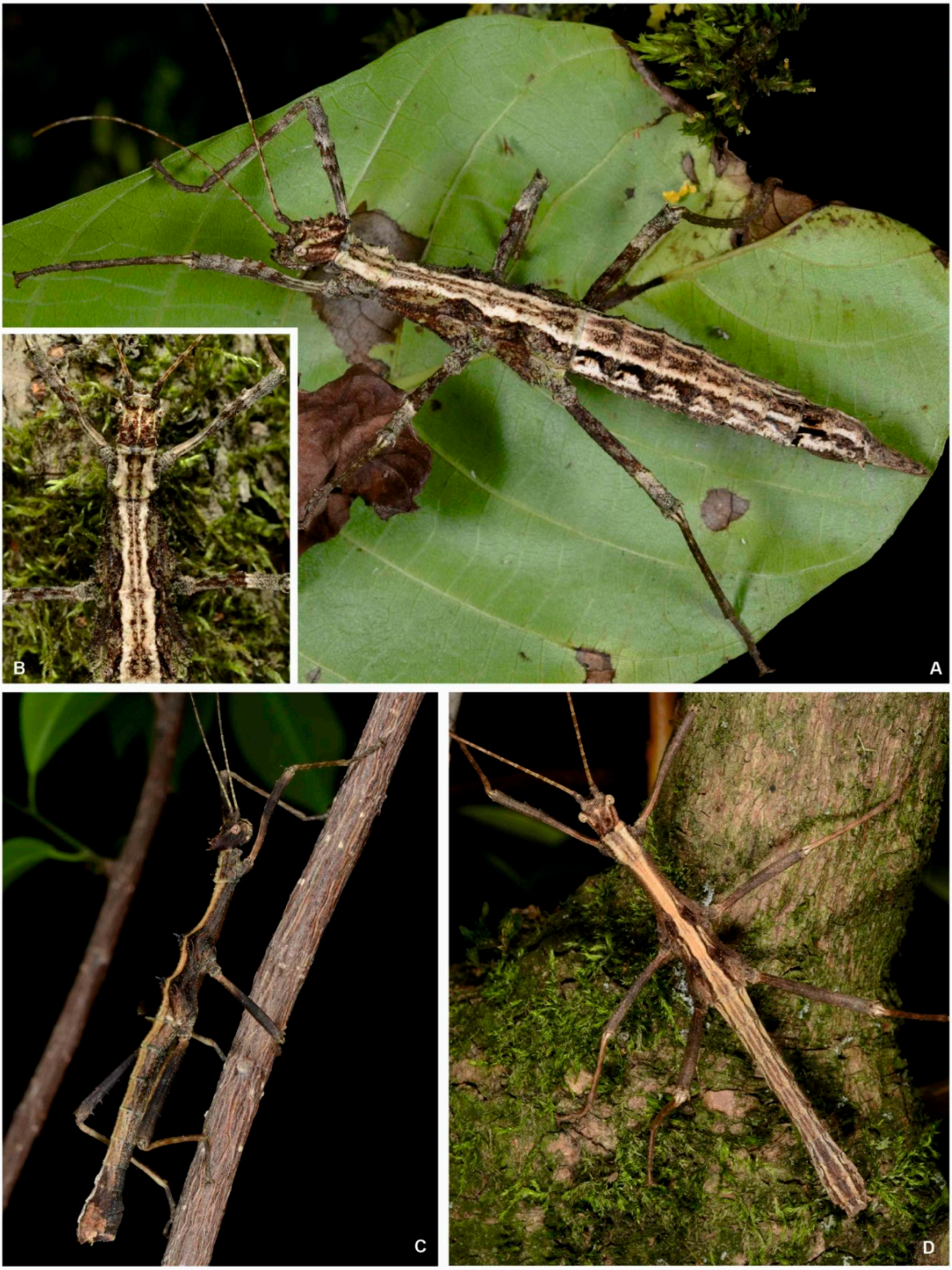

Fig. **53**. *Sungaya ibaloi* **n**. **sp**. live captive reared insects.

– **A**. ♀ pretty striped colour form. – **B**. Closeup of head and prothorax of ♀ shown in A and demonstrating camouflage on moss. – **C**. Paratype ♂ (F2-generation) in lateral view. – **D**. Striped ♂ in dorsal view.

posterior margin roundly indented medially and obtusely bi-lobed (Fig. 51D). Epiproct notably longer than anal segments, gently narrowing towards an angular and weakly concave apex. Subgenital plate slightly projecting beyond epiproct with apex triangular (Fig. 51C-D). Legs all rather slender. All of the major teeth of the femora on average comparatively broader and more triangular in shape than in *aeta*. Basitarsus longer than proceeding two tarsomeres taken together.

♂ (Fig. 52)

Typical for the genus (body length 51.0-59.5 mm) and morphologically very similar to *S. aeta* **n**. **sp**. from the Bataan province. Body armature weakly developed with only the posterior meso- and metanotals distinctly spinose. Colouration variable but basically as in *aeta*. Poculum usually with a pair of velvety black markings posteriorly (Fig. 52J). Vertex comparatively more strongly raised and peg-like in shape than in *aeta* with the median coronals, posterior pair of occipitals and posterior pair of supra-orbitals notably larger, roughly uniform in size and forming a hexa-spinose crown (Fig. 52L). Supra-antennals somewhat less pronounced than in *aeta*. Inter-posterior pronotals strong, conical and just slightly smaller than the spinose posteriors; the anterior pronotals low and conical. Mesothorax slender, elongate and almost 3x longer than prothorax (Fig. 52L); mesonotum with surface unevenly tuberculate but without any enlarged tubercles. Posterior meso- and metanotals represented by distinct spines and with some small tubercles round their base (Fig. 52L). Meso- and metapleurae only with one notably enlarged, short but spiniform supra-coxal. Meso- and metasternum tectate medio-longitudinally with the keel densely supplied with shiny granules and forming a rounded cluster of granules pre-posteriorly (Fig. 52K). Abdominal segments II-VII slightly gradually decreasing in length; terga II-VII with all elements of armature merely represented by small node-like tubercles, which become increasingly indistinct towards VII; only the posterior series occasionally somewhat pronounced. Sterna II-IV with an anterior pair of short spines and a posterior pair of somewhat more distinct spines, all of which gradually disappear towards VII. Anal segment with lateral margins somewhat protruded and obtusely angular basally, the posterior margin with a narrow, rounded median notch and the outer angled obtusely rounded (Fig. 52H). Epiproct small, rounded. Vomer basically triangular with terminal point small, spinose and notably arched dextrally (Fig. 72Q). Poculum with posterior margin indented medially and weakly bi-lobed (Fig. 52J, 72Q). Legs all long, slender and comparatively somewhat more elongate than in *aeta*.

Egg (Fig. 73T-U)

Large and of typical shape for the genus; capsule bulgy, strongly constricted anteriorly and the polar area moderately constricted and obtusely conical with an obtuse central protrusion that is somewhat flattened in centre; a further rounded angle or bulge posteroventrally. Surface smooth but densely and minutely pitted. Micropylar plate very weakly raised above capsule surface and sculptured like capsule; shape broadly and invertedly T-shaped with the apex of all ends expanded and rounded; the lateral extensions somewhat larger than the median portion and reaching *ca.* 65% along lateral surfaces of capsule; posteromedian portion gently concave and with a fairly distinct bowl-shaped micropylar cup. Outer margin of plate broad and bulgy. Median line an obtuse bulge that reaches about half the way to pole of capsule. Operculum slightly oval in outline, flat and pitted like capsule with a very slight central bump; opercular angle *ca.* -8°. Colour ochraceous grey; the outer margin of the micropylar plate dark grey, anterior margin and posterior protrusions of capsule as well as the operculum blackish. Measurements [mm]: Length 4.8-4.9, width 3.4-3.5, height 3.8-3.9, length of micropylar plate 2.8.

Remarks. – The specimens collected at the type-locality by Thierry Heitzmann in 2013 gave rise to a culture stock that is being successfully reared in Europe. The first eggs were given to Bruno Kneubühler (Switzerland) who raised the first specimens in 2015 and distributed the species as *Sungaya inexpectata* "Benguet". The breeding conditions correspond to those summarized for *S. aeta* **n**. **sp**. above.

Distribution. – NW-Luzon, Cordillera Region, Province Benguet (mountainous habitats).

Sungaya inexpectata Zompro, 1996
(Fig. 54 & 71H)

Sungaya inexpectata Zompro, 1996: 450, figs. 1-3.

HT, ♀: Philippinen, Luzon, Batangas, Tagaytay, Sungay 400 m, 7.X. 1995 leg. O. Zompro [OZ];

PT, ♀: Philippinen, Luzon, Batangas, Tagaytay, Sungay 400 m, 8.IX. 1995 leg. O. Zompro [OZ];

PT, **2** ♀: F1-generation captive reared from type-locality [OZ].

- Clark-Sellick, 1998: 208. (Micropylar plate of eggs)
- Zompro, 1999: 46. (Notes on culture)
- Zompro, 2000: 63.
- Brock, 2003: 41, fig. (Notes on rearing)
- Whiting, Bradler & Maxwell, 2003: 265.
- Zompro, 2004: 217, fig.
- Delfosse, 2004: 3. (Notes on rearing)
- Otte & Brock, 2005
- Delfosse, 2007: 23. (Notes on rearing)
- Lit & Eusebio, 2008: 38, figs. (in part). (Notes on distribution)
- Harman, 2012: 18. (Note on culture origin)

	♀, **HT** [RBINS]	♂, **PT**	♀, **PT**
Body	72.1	51.0-59.5	78.5-85.0
Pronotum	5.2	3.7-3.9	5.6-5.8
Mesonotum	11.7	9.6-11.3	12.2-13.2
Metanotum	6.8	5.0-5.5	6.9-8.0
Median segment	3.8	2.8-3.1	3.9-4.2
Profemora	14.5	13.2-13.4	15.1-17.2
Mesofemora	13.3	11.2-11.5	13.8-14.1
Metafemora	18.9	15.3-16.8	17.7-20.4
Protobiae	15.8	14.0-14.2	15.8-18.0
Mesotibiae	13.3	11.2-11.6	13.6-15.1
Metatibia	20.1	15.3-16.0	20.0-23.0
Antennae	-	32.0-36.0	38.0-40.0

Table 6. Measurements of *Sungaya ibaloi* **n**. **sp**.

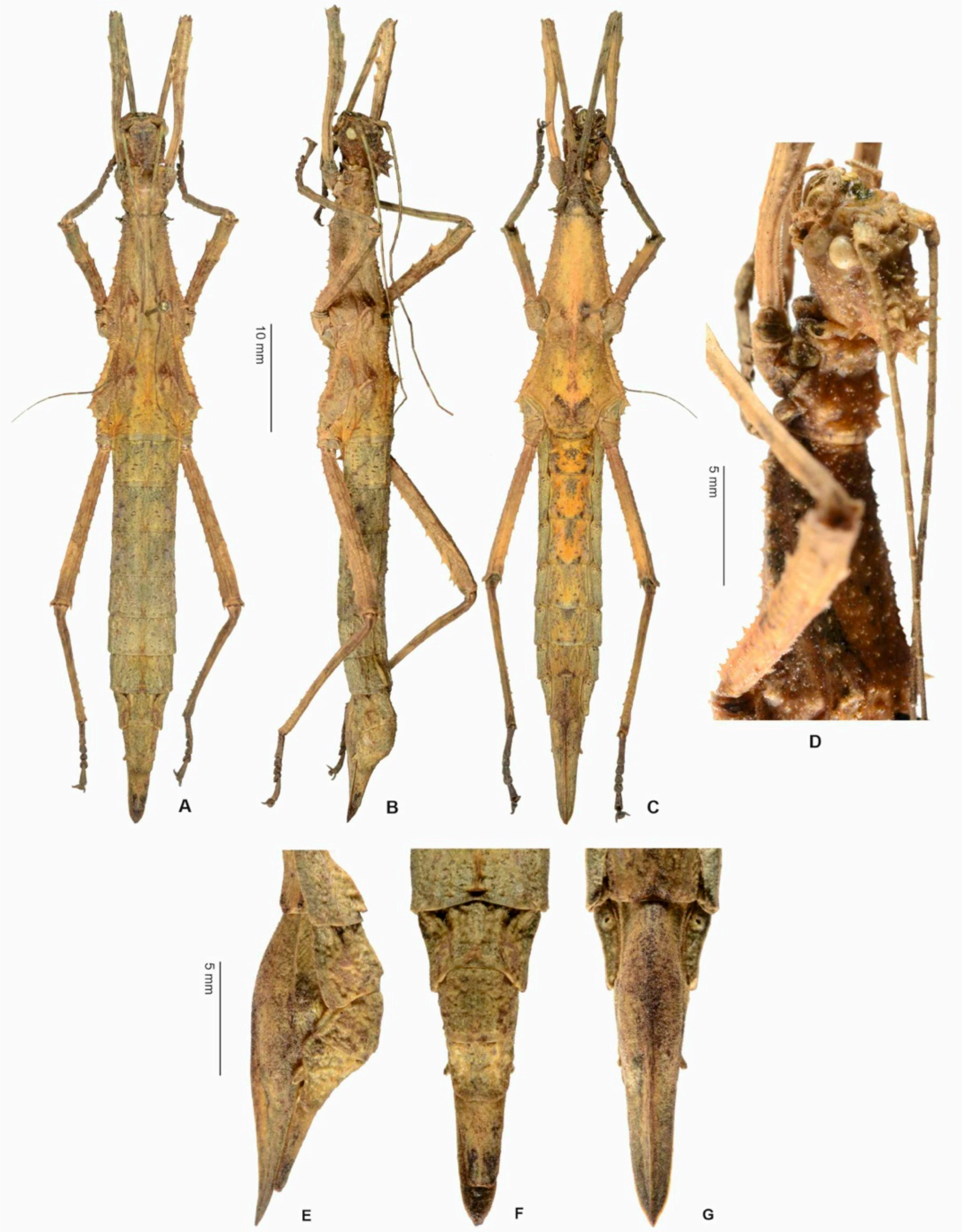

Fig. **54**. *Sungaya inexpectata* Zompro, 1996 ♀ reared from type-locality [FH].
– **A**. Habitus dorsal view [FH 0370-7]. – **B**. Habitus dorsolateral view [FH 0370-7]. – **C**. Habitus ventral view (FH 0370-7]. – **D**. Head and thorax of paratype in lateral view [FH 0370-1]. – **E**. Terminalia in lateral view. – **F**. Terminalia in dorsal view. – **G**. Terminalia in ventral view.

- Dräger, 2013: 3, fig. 3.
- Brock & Büscher, 2022: 521, figs.

[**Not**: *Sungaya inexpectata*, Lit & Eusebio, 2008: 38 – The specimens from Mount Cayapo, Bataan Province most likely represent *S. aeta* **n. sp.**]

Material examined

12 ♀, **1** ♀ (penultimate instar), 6 ♀ (juvenile): ex Zucht: F. Hennemann, urspr.: Philippinen (Luzon), 1998; Herkunft: Philippinen, Luzon, Batangas, Tagaytay, Sungay, 400 m, leg. O. Zompro 7.X.1995 [FH No's 0370-1 to 19].

Remarks. – Zompro (1996: 450) originally described this species from ♀ and eggs collected in 1995 in the Batangas Province southeast of Manila, Luzon. Unfortunately, all type-specimens are deposited within the authors collection and thus not available for detailed examination. However, captive reared specimens that are offspring from the type specimens are at hand from the authors collection. Molecular data of *Sungaya* populations from different localities have shown all to be not conspecific with the type-species *S. inexpectata* and to represent separate species. This is here supported by detailed morphological examination and comparison with the examples of *inexpectata* in the authors collection, with two of the populations described as two new species (*S. aeta* **n. sp.** and *S. ibaloi* **n. sp.**). Since the supposed ♂ described by Lit & Eusebio (2008) from Mount Cayapo, Limay, Bataan Province have genetically proven to be specifically distinct from *inexpectata*, the ♂ of Zompro's species is still not known and the type-locality must be regarded the so far only known locality.

The original parthenogenetic culture stock was included on the phasmid Study Group culture-list as PSG culture No. 195. A plethora of papers (Zompro, 1999; Brock, 2003; Delfosse, 2004; Delfosse, 2007) have dealt with the captive breeding and biology of *S. inexpectata*. Only selected references are listed above and the full references may be referred to in the Phasmida Species File (http://Phasmida.SpeciesFile.org). Body length of ♀ 76.0-85.0 mm.

Distribution. – Central Luzon, Province Batangas.

Genus ***Trachyaretaon*** Rehn & Rehn, 1939

Differentiation. – Distinguished from *Aretaon* Rehn & Rehn, 1939 by the presence of inter-posterior pronotal spines and anterior mesal metanotal spines as well as indistinct anterior mesonotals. Moreover, the vertex is notably more convex and conical in *Trachyaretaon* and the genus is not represented in Borneo. The eggs readily differ from those of *Aretaon* by having the anterior end of the micropylar plate narrow and rounded (Fig. 74C-Q), broadened, roundly angular and idented in *Aretaon*). From *Sungaya* Zompro, 1996 the genus is very difficult to separate based on the morphology of the insects and can basically only be distinguished by the stockier habitus and on average more strongly developed body armature of both sexes, ♂ having the mesothorax < 2.5x longer than the prothorax and ♀ having the mesothorax much more trapezoidal in shape with the posterior portion > 2x wider than the anterior margin. Moreover, ♀ of *Trachyaretaon* have the ovipositor ± up-curved whereas it is rather straight in lateral aspect in *Sungaya*. The most obvious distinctive feature however is represented by the morphology of the eggs, which are simple and barrel-shaped in *Trachyaretaon* (Fig. 74C-Q), whereas eggs of *Sungaya* are basically lemon-shaped and rather resemble those of *Obrimus* in having the anterior portion of the capsule with a distinct constriction and the polar-area with an obtusely conical protrusion (bi-gibbose with a transverse indention in *Obrimus*).

Remarks. – Originally described as a subgenus of *Aretaon*, Zompro (2004) raised *Trachyaretaon* to generic rank, which was supported by molecular data (Bank *et al.,* 2021), which also revealed *Trachyaretaon* as the sister-taxon of *Sungaya* (Bank *et al.,* 2021). The numerous citations of *Trachyaretaon* may be referred to in the Phasmida Species File (http://Phasmida.SpeciesFile.org).

The actual diversity of this genus is not yet known. There are further possibly new species on the islands of Leyte, Samar, Mindoro and perhaps even Mindanao that are represented by single specimens in the authors collection and the collection of RBINS. However, these

Keys to the species of *Sungaya*

♂*

1. Mesothorax 2.6x longer than prothorax (Fig. 46H); vomer large, the apex with a rounded protrusion sinistrally and the terminal hook long and strong (Fig. 72P); Western Central Luzon . . . . ***aeta*** **n. sp.**

— Mesothorax 3x longer than prothorax (Fig. 52A-B); vomer smaller, evenly triangular with terminal point small and rather short (Fig. 72Q); NW-Luzon . . . . ***ibaloi*** **n. sp.**

* The ♂ of *S. inexpectata* Zompro, 1996 and *S. dumagat* **n. sp.** are not known.

♀

1. Body surface granular to sparsely tuberculate; posterior margin of anal segment with a shallow, concave emargination **2**

— Body surface densely tuberculate and spinulose (Fig. 50B-C); posterior margin of anal segment with adeep triangular excavation (Fig. 50F); N-Luzon. . . . . ***dumagat*** **n. sp.**

2. Stocky species; mesonotum < 2.2x longer than width at posterior margin; posterior margin of abdominal sternum VII with a rounded indention or emargination. **3**

— Slender species with rather delicate limbs; mesonotum > 2.2x longer than width at posterior margin (Fig. 54A); praeopercular organ formed by a triangular median excavation at posterior margin of abdominal sternum VII (Fig. 54G); Central Luzon . . . . . . ***inexpectata***

3. Praeopercular organ formed by a distinct semi-circular median excavation at posterior margin of abdominal sternum VII (Fig. 47E); Western Central Luzon . . . . ***aeta*** **n. sp.**

— Praeopercular organ formed by a shallow and small median indention at posterior margin of abdominal sternum VII and a pair of obtuse, conical tubercles (Fig. 51E); NW-Luzon . . . . ***ibaloi*** **n. sp.**

are morphologically so close to described species or species newly described herein, that the differences observed need to be evaluated by additional material like the still unknown opposite sex and the eggs. It is hoped that more material will become available so that these specimens can be covered in a future study to broaden our knowledge of the diversity of *Trachyaretaon*.

Based on molecular data Bank *et al.* (2021) suggested a new genus for the species from Negros here described as *T. negrosanon* **n. sp.** However, there is no morphological evidence that would support a generic separation of this species and the apparently very closely related *T. tumandok* **n. sp.** from the island of Panay. The only character that allows distinction of these two species from other members in the genus *Trachyaretaon* is the black abdominal sterna of ♂ (see key below). The typical shape of the micropylar plate of the eggs of *negrosanon* **n. sp.** (Fig. 74L-M) in which the posterolateral extensions are strongly enlarged and angled towards the anterior is also seen in *T. mangyan* **n. sp.** from Mindoro (Fig. 74N-O), a species which is morphologically closest to the type-species *T. echinatus*. In *echinatus* (Fig. 74C-D) the micropylar plate has the posterolateral extensions small and straight like in *T. bresseeli* **n. sp.** (Fig. 74G-H), *T. nakatago* **n. sp.** (Fig. 74J-K) or *T. carmelae* Lit & Eusebio, 2005 (Fig. 74E-F).

Distribution. – So far recorded from the Philippine islands of Luzon, Babuyan Islands, Mindoro Panay, Negros as well as Palawan.

Species included

1. ***Trachyaretaon bresseeli*** **n. sp.**
Distribution: Luzon.

2. ***Trachyaretaon carmelae*** Lit & Eusebio, 2005: 77, fig. 1.
= *Trachyaretaon brueckneri* Hennemann & Conle, 2006: 219, figs. 3-4, 7-9. **n. syn.**
Distribution: Babuyan Islands & N-Luzon.

3. ***Trachyaretaon echinatus*** (Stål, 1877: 68).
Distribution: Luzon.

4. ***Trachyaretaon gatla*** Zompro, 2004: 213, fig. 124b.
Distribution: Palawan.

5. ***Trachyaretaon maliit*** **n. sp.**
Distribution: Luzon.

6. ***Trachyaretaon mangyan*** **n. sp.**
Distribution: Mindoro.

7. ***Trachyaretaon nakatago*** **n. sp.**
Distribution: Luzon.

8. ***Trachyaretaon negrosanon*** **n. sp.**
Distribution: Negros.

9. ***Trachyaretaon tumandok*** **n. sp.**
Distribution: Panay.

Trachyaretaon bresseeli n. sp.

(Fig. 55-57, 72N & 74G-H)

ZooBank: https://zoobank.org/63B72699-AC14-49BB-AE42-107A7786250B

Trachyaretaon echinatus, Bollens & Krijns, 2010: 18, figs. Harman, 2015: 26. [Note on culture stock].

HT, ♀: Philippines, Luzon, Aurora Prov., VII.2009, leg. Bellemans, Van Dingenen, Derijck [RBINS].

PT, **3** ♀, **2** ♂: Philippines, Luzon, Aurora Prov., VII.2009, leg. Bellemans, Van Dingenen, Derijck [RBINS].

PT, **5** ♀, **11** ♂: Philippines, Luzon, Aurora Prov., VII.2009, leg. Bellemans, Van Dingenen, Derijck; ex culture Bresseel, 2010 [RBINS].

PT, **22** ♀, **25** eggs: ex Zucht F. Hennemann 2012-2013, Cagayan Valley, Prov. Nueva Vizcaya, Imugan Falls, 900-950 m, 2015 [FH, No's 1467-1 to 22, E].

PT, **11** ♀, **11** ♂: ex Zucht F. Hennemann 2012-2013, Philippinen, NE-Luzon, Cagayan Valley, Prov. Aurora, Cunayan / Ditumabo Falls nr. San Luis, leg. Bresseel 2009, PSG No. 317 [FH, No's 1467-23 to 45].

Differentiation. – This new species is morphologically very close to *T. mangyan* **n. sp.** from Mindoro and *T. nakatago* **n. sp.**, the latter of which also occurs in northern Luzon. With *mangyan* it shares the stocky overall shape and rather poorly developed body armature. Females are very similar and may only be separated by the very indistinct to wanting medio-longitudinal carina on the meso- and metasternum (Fig. 56G), narrower posteromedian emargination of abdominal sternum VII (Fig. 56C), somewhat deeper and broader posteromedian notch of the anal segment (Fig. 56B) and the more incrassate femora, which have all the dentations notably larger and broader. Males can be distinguished by the less pronounced and shallower medio-longitudinal carina of the meso- and metasternum (Fig. 56H), slightly more incrassate metafemora, broadened and basally more expanded anal segment (Fig. 56E), medially notched and weakly bi-lobate posterior margin of the poculum (Fig. 56F, narrowly rounded in *mangyan*) as well as the broader and heart-shaped vomer, which has the terminal point comparatively shorter (Fig. 72N). The eggs (Fig. 74G-H) represent the most reliable distinction from *mangyan*, and clearly distinguish *bresseeli* by having the posterolateral extension of the micropylar plate small and not expanded towards the anterior as in *mangyan*. From the morphologically very similar *nakatago* **n. sp.** ♀ of this new species merely differ by the notably smaller size and somewhat stockier shape, larger ventral teeth of the femora, less distinct mesosternals and much less pronounced to wanting medio-longitudinal carina of the meso- and metasternum (Fig. 56G). Males may be separated from those of *nakatago* by the much less distinct medio-longitudinal carina of the meso- and metasternum (Fig. 55K, 56H), larger ventral teeth of the meso- and metafemora but slenderer metafemora that have the dorsal subapical portion not inflated like in *nakatago*, as well as the bi-labiate and medially indented posterior margin of the poculum (Fig. 56F, 72N). The eggs (Fig. 74G-H) are also very similar to those of *nakatago* and may only be distinguished by the more narrowed polar half of the capsule and slightly less downward directed posterolateral expansions of the micropylar plate.

From the type-species T. *echinatus*, which also occurs throughout Luzon, this new species can be separated by the stockier shape and less developed elements of thoracic armature but in particular, the notably smaller and not peg-like posterior mesonotals and metanotals of ♀, and lack of a posteromedian excrescence or dentiform protrusion on abdominal terga V-VII in ♂. Females can furthermore be distinguished by the less triangularly expanded posterolateral angles of abdominal terga IV-VII (Fig. 55A-C), the very indistinct to wanting medio-longitudinal carina on the meso- and metasternum (Fig. 56G), much less pronounced armature of the abdominal terga, more deeply emarginated posterior margin of the anal segment (Fig. 56B) and not notably notched apex of the epiproct. Males can additionally be distinguished by lacking the characteristic black ventral surface of the coxae seen in *echinatus* (Fig. 59G) as well as the much less distinct medio-longitudinal carina of the meso- and metasternum (Fig. 56G), basally much broader anal segment (Fig. 56E, just slightly narrowing towards posterior in *echinatus*), the medially notched posterior margin of the poculum (Fig. 56F) and broader, hear-shaped vomer which has the terminal point notably shorter and rather conical (Fig. 72N, hook-like in *echinatus*). The eggs (Fig. 74G-H) are very similar to those of *echinatus* and merely differ by the slightly larger dimensions, having the operculum inserted into the capsule at a right angle (opercular angle 5° in *echinatus*) and the anterior extension of the micropylar plate less narrowed towards the apex.

Etymology. – This new species is named after Joachim Bresseel (Zermst, Belgium), who first collected specimens and established a culture in Europe, to acknowledge his generosity in making the extensive Obrimini material in the collection of RBINS, much of which was collected by him, available for this study and for the good friendship over many years.

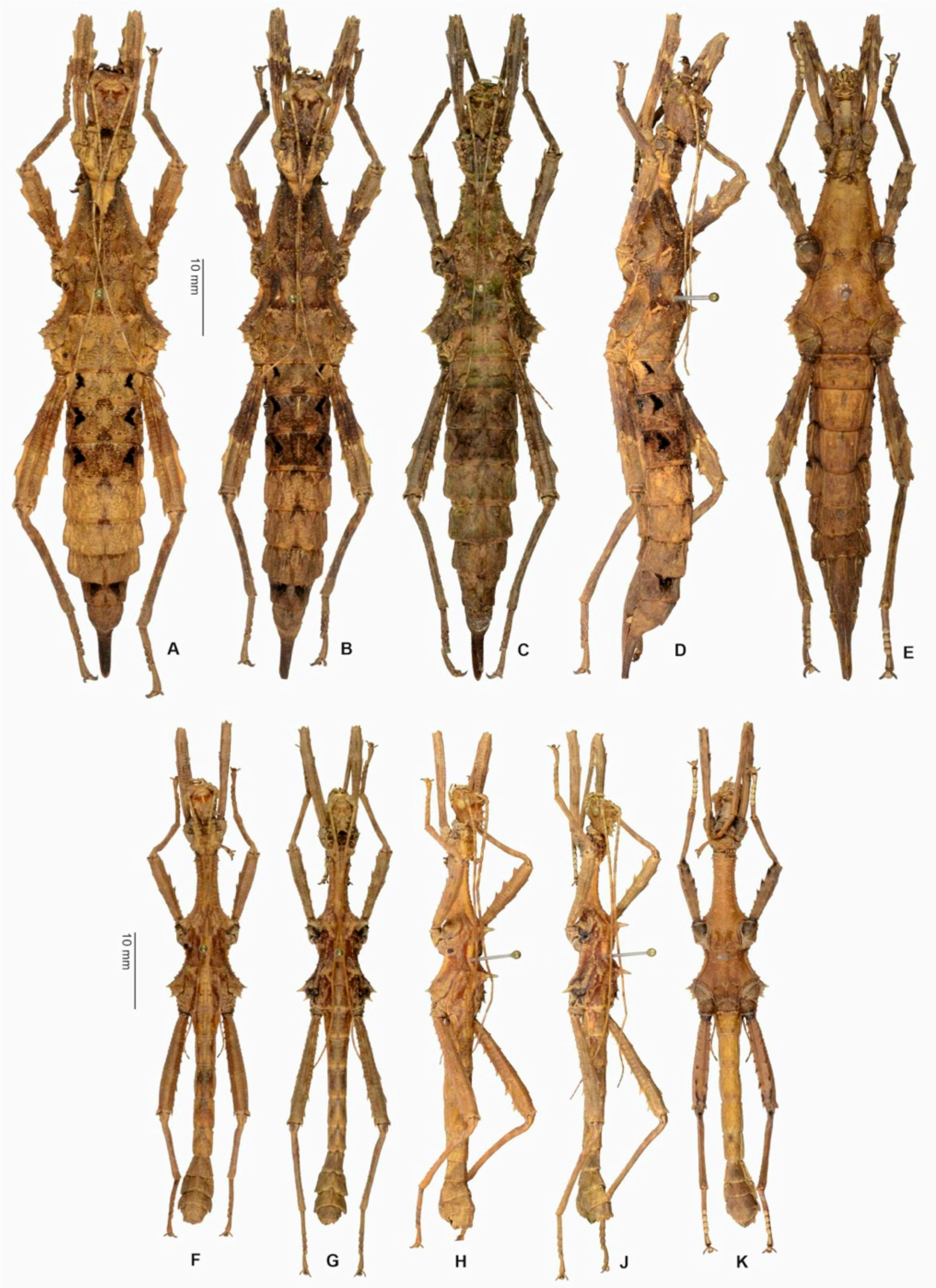

Fig. **55**. *Trachyaretaon bresseeli* **n**. **sp**. habitus.

– **A**. ♀ paratype, dorsal view [FH 1467-5]. – **B**. ♀ paratype, dorsal view [FH 1467-13]. – **C**. ♀ paratype, dorsal view [FH 1467-28]. – **D**. ♀ paratype, dorsolateral view [FH 1467-5]. – **E**. ♀ paratype, ventral view [FH 1467-13]. – **F**. ♂ paratype, dorsal view [FH 1467-37]. – **G**. ♂ paratype, dorsal view [FH 1467-39]. – **H**. ♂ paratype, dorsolateral view [FH 1467-37]. – **J**. ♂ paratype, dorsolateral view [FH 1467-39]. – **K**. ♂ paratype, ventral view [FH 1467-37].

Description

The colouration is described from colour photos of live wild and captive reared specimens.

♀ (Fig. 55A-E)

Form and colouration. – Moderately sized (body length 71.0-87.0 mm) and very stocky for the genus with moderately developed body armature and fairly low, but conical and multi-tuberculated posterior meso- and metanotals; body surface sparsely and unevenly granular to tuberculate and with a fine and rather obscure dorsal medio-longitudinal carina; the meso- and metasternum with the medio-longitudinal carina obscure to almost wanting. Colour very variable and ranging from various tones of dark to mid brown over buff and ochre to olive, although tones of mid brown are clearly dominant; colour mostly heterogenous and with darker and lighter portions. Abdominal terga II-IV usually darker in colour than other segments and lateral surfaces with a characteristic inversely V-shaped black marking and almost always with a triangular black anterior lateral marking on tergum VIII; occasionally with a dark anteromedian marking on abdominal terga II-VIII. Pronotum usually lighter in colour than rest of thorax and with two faint dark and closely spaced parallel longitudinal streaks. Mesonotum with a more or less clear pale cream or straw-coloured triangular anterior marking. Ventral body surface plain buff. Two more or less distinct roughly triangular dark brown markings on frons; the eyes dark brown and flecked with yellow. Antennae dark brown with some dark yellowish annuli. Femora with an irregular shaped dark brown median band and the apical portion usually lighter in colour than the basal portion.

Head. – Scarcely longer than wide with vertex fairly inflated, conically rounded and slightly projecting over anterior margin of pronotum (Fig. 57E); the supra-antennals distinct and conical and with some smaller tuberculiform granules around the base; supra-orbitals very small and genae with 2-4 irregularly placed, small and rather nodular gulars. The two four coronals strong and conical, but the lateral coronals somewhat more pronounced than the median coronals; vertex with four strong occipital medials that are about equal in size to each other and to the median coronals; in front only with a closely spaced pair of small medials. Eyes moderately projecting with the anterior margin weakly angular, the diameter of eye contained about 2x in length of gena. Antennae with 25 joints and reaching to posterior margin of abdominal segment III; the median antennomeres fairly elongated. Scapus compressed dorsoventrally and roundly rectangular, the pedicellus much shorter and slightly globose, III about 1.5x longer than pedicellus.

Thorax. – Pronotum about as long but slightly narrower than head, longer than wide with lateral margins concave and with a deep roughly semi-circular pre-median excavation; the transverse median sulcus shallow, gently arched and expanding almost over entire width of segment; surface sparsely and unevenly nodulose. The posterior pronotals fairly strong but short, obtusely conical and the largest of the pronotal spines; antero-laterals small; the anterior portion only with an indistinct and small pair of posterior mesal pronotals and the posterior half merely with an even smaller pair of medial tubercles; the inter-posterior pronotals only represented by small tubercles (Fig. 57E). Mesothorax gradually ascendant and widened towards the posterior, shape strongly trapezoidal with posterior margin about 2.4x wider than anterior margin; 2.1x longer than prothorax. Mesonotum less trapezoidal in outline and only with one or two small pairs of conical pre-median tubercles (occasional also a small pair of post-median tubercles present); compound posterior mesonotals rather low, conical and multi-tuberculated with the median tubercle somewhat enlarged, strong and conical (Fig. 57E); lateral margins unevenly tuberculated. Mesopleurae increasingly widened towards posterior and with a moderately strong and conical mesopleural; the antero-lateral and two of the supra-coxals somewhat enlarged and obtusely spiniform; surface otherwise irregularly tuberculated. Metanotum subquadrate with anterior portion slightly narrowed, the posterior metanotals like those of the mesonotum; in front with a slightly enlarged pair of median tubercles and the lateral margins minutely tuberculose. Metapleurae progressively deflexed towards the posterior; the compound metapleural fairly large, strong and conical; the lateral margin unevenly tuberculated and with about four notably enlarged laterals. Meso- and metasternum only with a very obscure to almost wanting medio-longitudinal carina (Fig. 56G); surface otherwise sparsely granulose and only with a few small and rather irregularly placed meso- and metasternals in the lateral sections.

Abdomen. – Median segment roundly trapezoidal in shape with anterior margin widely rounded and notably wider than long; the four posteriors only represented by small tubercles. Segments II-IV roughly uniform in width and slightly increasing in length, V somewhat widened and longer than preceding, VI-X narrowing with VI and VII slightly decreasing in length; V about 2.1x wider than long. Lateral margins of terga V-VII somewhat deflexed and obtusely angular posteriorly; surface of II-V with a fine medio-longitudinal carina than becomes increasingly pronounced from II to VII and is posteriorly raised to form a rounded excrescence on VII; otherwise only with five (four on VI and VII) small posterior tubercles. Sterna smooth except for an anterior and posterior pair of granules on II-VI. Praeopercular organ formed by a moderately broad, roughly semi-circular median excavation of posterior margin of sternum VII, which has the outer angles somewhat raised and swollen (Fig. 56C). Terga VIII and IX each with low and obtuse posteromedian swelling formed by an excrescence of the medio-longitudinal carina (Fig. 56A). Anal segment progressively narrowing; the anterior two-thirds strongly descendant and with a distinct and obtuse medio-longitudinal bulge; the posterior margin somewhat inflated and obtusely bi-dentate with roundly triangular indention medially (Fig. 56B). Cerci small, triangular and strongly flattened laterally. Epiproct straight in lateral aspect, on average 1.5x longer than anal segment, obscurely tectate longitudinally, almost parallel-sided in basal half and just slightly narrowing posteriorly towards an obtusely angular apex, that is somewhat up-curved. Subgenital plate long, lanceolate and distinctly keeled in the apical half; the apex moderately pointed and slightly surpassing tip of epiproct (Fig. 56A-C).

Legs. – Rather short and stocky for the genus with all femora notably incrassated and armed with prominent, triangular teeth. Basal flexure and constriction of profemora moderately developed; the two exterior ventral carinae with 2-3 big triangular teeth in apical one-third; the anterorsal carina with two and the posterodorsal carina with four teeth that strongly decrease in size towards the base of femur; the dorsal teeth lower but slightly broader than the ventral ones. All four carinae of meso- and metafemora with five teeth that become progressively smaller towards the base of femur with the two basal teeth rather minute; teeth on the ventral carinae acutely triangular in shape, those on the dorsal carinae low and somewhat broader; medioventral carina almost wanting and marked by some minute granules. Pro- and mesotibiae wholly unarmed, metatibiae only with a few small ventral denticulations in the apical half. Basitarsus about as long as proceeding three joints taken together.

♂ (Fig. 55F-K)

Form and colouration. – Size and general form average for the genus (body length 55.5-62.0 mm), body armature moderately developed with the posterior meso- and metanotals prominent, pointed and multi-tuberculose around the base; body surface sparsely granular to tuberculate; dorsal surface with a fine and very obscure medio-longitudinal carina. Colour less variable than in ♀; mostly various tones of ochre, buff and mid brown and occasionally with some olive; posterolateral portion of mesonotum as well as lateral portions of metanotum and most of metapleurae darker than rest of body and usually reddish mid to dark brown; the dorsal surface of thorax with a more or less clear straw-coloured, pale ochraceous or sometimes slightly greenish medio-longitudinal streak. Pronotum mostly greenish laterally and with two closely spaced dark brown longitudinal streaks medially. Posterior meso- and metanotals as well as meso- and metapleurals mostly mid to dark green. Ventral body surface rather uniformly buff to ochre. Poculum with a pair of distinct blackish markings posteriorly (Fig. 56D, F). Limbs brown with some irregular ochre to dark green mottling. Eyes and antennae coloured as in ♀.

Head. – Shape and armature essentially as in ♀ but vertex somewhat more conical and all the spines slenderer and more spinose. Eyes relatively larger, projecting hemispherically and the diameter of eye contained a little less than 2x in length of gena. Antennae like in ♀ but reaching to abdominal segment IV.

Thorax. – Prothorax generally as in ♀ but slightly narrowing towards the posterior, the lateral margins less concave and all elements of armature comparatively less pronounced; the posterior pronotals conical. Mesothorax fairly elongate for the genus being 2.6x longer than the prothorax; anterior two-thirds slender and roughly uniform in diameter except for a slight widening at anterior margin, posterior portion strongly widened and inflated. Mesonotum densely granular and rather tubercular along lateral margins with a shallow and obtuse medio-longitudinal bulge but otherwise unarmed except for a small anterior mesonotal tubercles; posterior mesonotals prominent, strong, spinose and with a few small obtuse tubercles and granules around the base. Metanotum with medio-longitudinal bulge somewhat more pronounced than on mesonotum, the posterior metanotals like those of the mesonotum. Pleurae with armature essentially like in ♀ but much less pronounced, only the meso- and

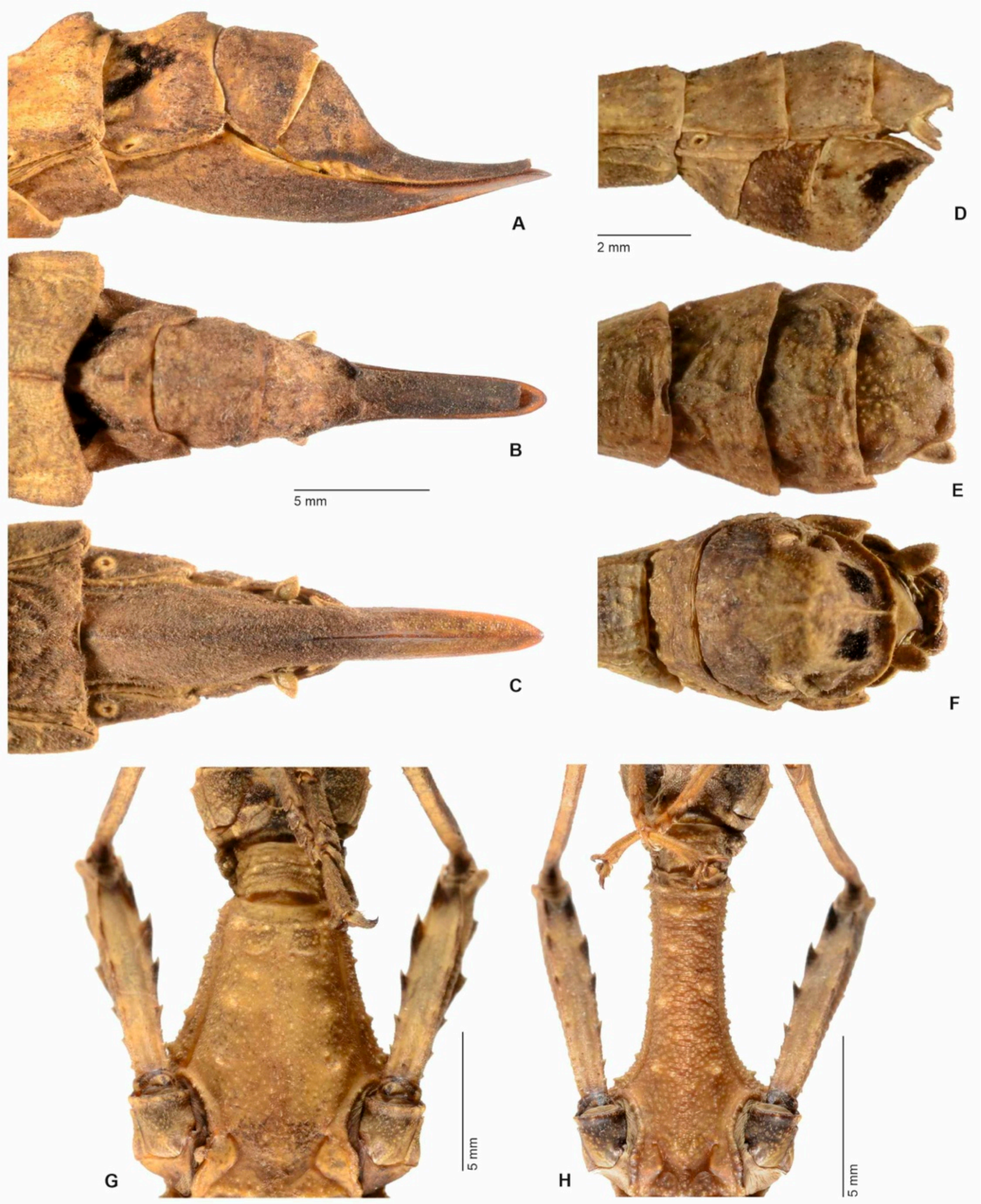

Fig. **56**. *Trachyaretaon bresseeli* **n**. **sp**. habitus.

– **A**. Terminalia of paratype ♀ in lateral view [FH 1467-5]. – **B**. Terminalia of paratype ♀ in dorsal view [FH 1467-5]. – **C**. Terminalia of paratype ♀ in ventral view [FH 1467-5]. – **D**. Terminalia of paratype ♂ in lateral view [FH 1467-37]. – **E**. Terminalia of paratype ♂ in dorsal view [FH 1467-37]. – **F**. Terminalia of paratype ♂ in ventral view [FH 1467-37]. – **G**. Mesosternum of ♀ paratype [FH 1467-5]. – **H**. Mesosternum of ♂ paratype [FH 1467-37].

	♀, **HT** [RBINS]	♂, **PT**	♀, **PT**
Body	84.6	55.5-62.0	71.0-87.0
Pronotum	6.5	3.7-4.0	5.0-6.1
Mesonotum	15.3	10.8-12.2	11.3-13.2
Metanotum	8.6	5.5-6.2	6.4-8.8
Median segment	5.0	2.7-3.0	3.0-3.3
Profemora	16.3	11.6-13.2	12.0-15.3
Mesofemora	15.7	11.4-12.4	11.9-14.5
Metafemora	21.2	15.0-16.2	16.2-19.5
Protibiae	15.4	11.2-12.8	13.1-16.2
Mesotibiae	13.5	10.4-11.2	14.0-14.8
Metatibia	19.1	14.5-15.0	16.5-19.3
Antennae	-	38.0-43.0	36.0-46.0

Table 7. Measurements of *Trachyaretaon bresseeli* **n. sp**.

metapleural larger and more spinose in shape; the mesopleurae with a somewhat enlarged and spiniform antero-lateral tubercle. Meso- and metasternum more densely granulose than in ♀; mesosternum with six indistinct, low and obtuse paired mesosternals (Fig. 56H); metasternum only with two small tuberculiform metasternals laterally.

Abdomen. – Median segment almost semi-circular in outline and with an obtuse medio-longitudinal bulge; the five posteriors only represented by small tubercules and the median portion with two small pairs of nodes. Segment II trapezoidal, III-VI uniform in width, just slightly subuniform in length, III-V and on average 1.5x longer than wide; VII notably shorter than all preceding segments, clearly trapezoidal and strongly widening towards posterior. Terga II-VII with the medio-longitudinal carina becoming increasingly distinct towards VII, otherwise without any noteworthy armature except for a weakly indicated pair of latero-anteriors. Sternum II with a pair of low posterior tubercles, III-VI smooth. Terga VIII and IX transverse with lateral margins moderately deflexed and gently widening; IX with the lateral margin angular and somewhat protruded posteriorly and with a low, obtuse posteromedian swelling. Anal segment basically trapezoidal in dorsal aspect, being notably narrowed towards the posterior; the lateral margins with a small and obtuse dentiform process anteriorly and weakly concave in the median section (Fig. 56D); the posterior margin somewhat inflated and clearly bi-lobate with a distinct roundly triangular median emargination; dorsally with a shallow rounded pit near each outer posterior angle (Fig. 56E). Epiproct fairly large, shield-shaped, almost semi-circular and notably projecting over posterior margin of anal segment. Vomer with base very broad and basically heart-shaped, the terminal point rather short, conical and distinctly arched towards the right (Fig. 72N). Cerci strongly compressed laterally, small and roundly triangular. Poculum large, bulgy, obtusely cup-shaped and with an acute medio-longitudinal keel in the vertical posterior portion; posterior margin broad, moderately labiate and bi-lobate with a small triangular median indention (Fig. 56F).

Legs. – Basically, with armature like in ♀, but all teeth comparatively much smaller, more acute and rather spiniform; those on the dorsal carinae in particular much less pronounced; hind legs projecting considerably over apex of abdomen. The basal two teeth on the two exterior ventral carinae of the metafemora strong and spinose. Basitarsus slightly longer and slenderer than in ♀, the pro- and metabasitarsus notably longer than following three joints taken together.

Variability. – Considerable variability is seen in the often heterogenous colouration of ♀ in particular, which is largely summarized in the description above (Fig. 57A-C). Some variability can also be observed in the size and development of the cephalic and thoracic armature as well as the size and shape of the posteromedian excrescence of abdominal tergum VII. Males are generally much less variable in all aspects.

Egg (Fig. 74G-H)

Moderately sized for the genus; capsule elongate with the posterior half very scarcely narrowing, slightly oval in cross-section; about 1.8x longer than wide. Surface densely pitted; the anterior one-sixth and operculum covered with very short setae. Micropylar plate rather small and only about 0.65x the length capsule; basically Y-shaped with the median portion slightly narrowing anteriorly and the two posterolateral extensions small, oval and extending on lateral surfaces of capsule almost at an angle of 90°; surface of plate pitted like capsule and the outer margin weakly inflated. Posterior portion widely V-shaped with a minute bowl-shaped micropylar cup in centre. Median line distinct and formed by a narrow bulge that almost reaches to polar area. Operculum almost round with the outer margin flat and the inner portion weakly convex; inserted into capsule roughly at right angle. General colour plain greyish mid brown, the setose anterior portion of capsule and operculum sepia brown; outer margin of micropylar plate dark brown. Measurements [mm]: Length 4.5-4.6, width 2.6, height 2.4, length of micropylar plate 2.8.

Remarks. – Two culture stocks from Cagayan Valley, Aurora Province have been introduced to Europe. The first stock was collected at the Cunayan and Ditumabo waterfalls by Joachim Bresseel (RBINS) in July 2009 and is the offspring of the holotype and paratypes. This culture was subsequently included on the Phasmid Study Culture List as culture No. 317 *Trachyaretaon* sp. 'Aurora' and is still being reared in captivity throughout Europe. A second parthenogenetic stock was introduced from the Imugan Falls but appears to have been lost meanwhile. In captivity this species readily accepts bramble (*Rubus* spp., Rosaceae), hazel (*Corylus avellana*, Betulaceae), ivy (*Hedera helix*, Araliaceae) and pyracantha (*Pyracantha* spp., Rosaceae) as alternative food plants. It is easy to culture in humid conditions and average temperatures of 22-25°C.

Distribution. – Northeast Luzon.

Trachyaretaon carmelae Lit & Eusebio, 2005

(Fig. 58, 71D-E & 74E-F)

Trachyaretaon carmelae Lit & Eusebio, 2005: 77, fig. 1.

HT, ♀: Dalupiri I., Calayan, v.2004, C.P. Española & C. Oliveros [UPLB, No. PHA-00346];

AT, ♂: Dalupiri I., Calayan, v.2004, C.P. Española & C. Oliveros [UPLB, No. PHA-00347]; [UPLB];

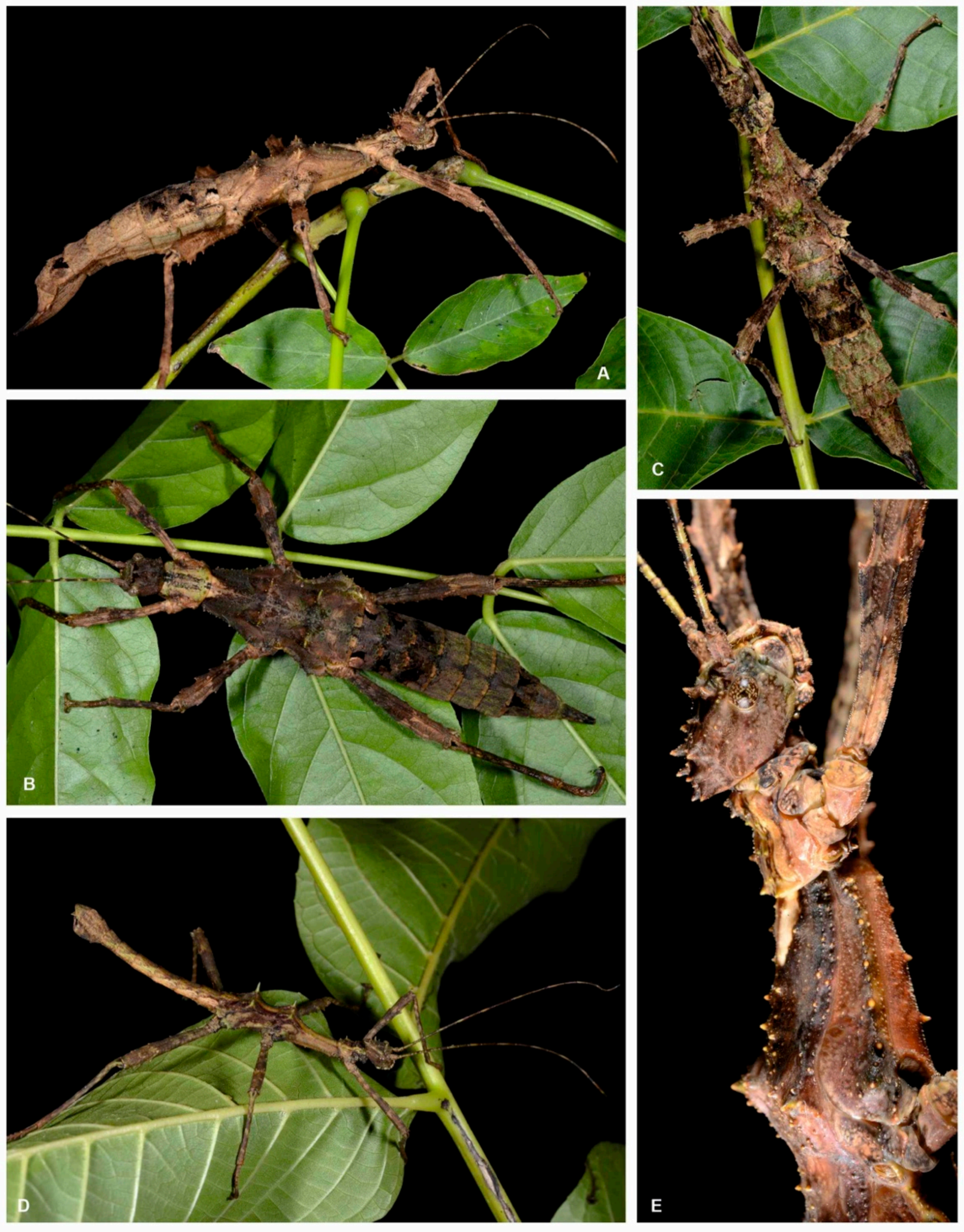

Fig. **57**. *Trachyaretaon bresseeli* **n**. **sp**. live captive reared insects (paratypes).
A-**C**. Different colour varieties of ♀. – **D**. ♂. – **E**. Closeup of head and thorax of ♀.

PT, ♀, ♂, **3** eggs (ex ovipositor): Babuyan, 08-VI-2004, Tiffany C. Cham (private coll.) [UPLB, No's PHA-00348 & 00351];

PT, ♀, ♂, ♀ (juvenile), **2** ♂ (juvenile): Dalupiri I., Calayan, v.2004, C.P. Española & C. Olivero [UPLB, No's PHA-00340, PHA-00350, PHA00352, PHA-00354, PHA-00355];

PT, ♀ (juvenile): Lungog, Calayan I., Cagayan Prov., iv.2004, C.P. Española & C. Oliveros [UPLB, No. PHA-00353].

- Brock & Büscher, 2022: 331, 522, figs.

= *Trachyaretaon brueckneri*, Hennemann & Conle, 2006: 219, figs. 3-4, 7-9.

HT, ♀: Northern Philippines, Babuyan Islands, Calayan Id., VI.2003, via I.O. Lumawig [ZSMC];

PT, ♀, **2** eggs: ex Zucht O. Conle,: N-Philippines, Babuyan Islands, Calayan Id., F1-Generation, 2004 [ZSMC];

PT, ♂, ♀, **2** eggs: ex Zucht F. Hennemann: N-Philippines, Babuyan Islands, Calayan Id., F1-Generation, 2004 [UPBLB];

PT, ♂, ♀, **2** eggs: ex Zucht F. Hennemann / O. Conle: N-Philippines, Babuyan Islands, Calayan Id., 2004-2005; PSG culture No. 255; BMNH(E) 2005-34 [NHMUK, No's BMNH(E) #8435227 & BMNH(E) #8435226];

PT, ♂, ♀, **2** eggs: ex Zucht F. Hennemann: N-Philippines, Babuyan Islands, Calayan Id., F1-Generation, 2004 [NHMW];

PT, **2** ♂, **2** ♀, **2** eggs: ex Zucht O. Conle: N-Philippines, Babuyan Islands, Calayan Id., F1-Generation, 2004 [MNHU];

PT, **2** ♂, **2** ♀, eggs: Northern Philippines, Babuyan Islands, Calayan Id., VI.2003, via I.O. Lumawig [FH, No's 0498-1 to 4 & E];

PT, **20** ♂, **10** ♀, eggs: ex Zucht F. Hennemann: N-Philippines, Babuyan Islands, Calayan Id., F1-Generation, 2004 [FH, No's 0498-5 to 34 & ED];

PT, **4** ♂, **3** ♀: Northern Philippines, Babuyan Islands, Calayan Id., VI.2003, via I.O. Lumawig [OC];

PT, **22** ♂, **22** ♀: ex Zucht O. Conle,: N-Philippines, Babuyan Islands, Calayan Id., F1-Generation, 2004 [OC]. **n**. **syn**.

- Tamayo Lorenzo, 2009: 9. (Gynandromorph)
- Harman, 2013b: 12. (Note on culture stock)
- Brock et al., 2016: 163. (Type data)
- Brock & Büscher, 2022: 522.

Material examined

6 ♀, **6** ♂, **1** egg: Ex. Breeding J. Bresseel 2014; Origin: North Philippines, Babuyan Islands, I.G.: 32,739 [RBINS];

5 ♀, **7** ♂, **3** eggs: Philippines, Babuyan Isl., Calayan Isl., Ex Breeding J. Bresseel 2010 [RBINS];

1 ♂, **1** ♀: Coll. R.I.Sc.N.B., Philippines, Sta. Ana, Cagayan, North Luzon, June 2014 [RBINS].

Remarks. – *T. carmelae* and *T. brueckneri*, both described from Calayan Island, one of the Babuyan Islands north of Luzon, are the same species. Thus, the latter species is here synonymised under *carmelae* (**n. syn.**). Both species were described from both sexes and the eggs. The publication of the paper by Hennemann & Conle (2006) was originally submitted and accepted for publication by the journal in 2004 but publication was delayed. This is why culture stock of this species introduced to Europe from the Calayan Islands by I. O. Lumawig in 2003 was already referred to under the unpublished name "*brueckneri*" (see Lit & Eusebio, 2005: 80). Notes on captive breeding and alternative food-plants were provided by Hennemann & Conle (2006: 223). Body lengths: ♀ 101.8-130.0 mm, ♂ 66.0-85.0 mm.

The two specimens from Santa Ana, Cagayan in the collection of RBINS are the first record of *T. carmelae* from the island of Luzon. These slightly differ from the Babuyan population by the somewhat more pronounced posterior meso- and metanotals, less distinct row of medio-longitudinal granules on the ventral surface of the meso- and metafemora of both sexes, and the 3 has the meso- and metafemora somewhat more inflated. Body lengths: ♀ 107.8 mm, ♂ 72.6 mm.

Distribution. – Babuyan Islands (Dalupiri Island & Calayan Island). N-Luzon (Province Cagayan, Santa Ana [RBINS].

Trachyaretaon echinatus (Stål, 1877)

(Fig. 59-60. 71A, 72J & 74C-D)

Obrimus echinatus Stål, 1877: 68.

HT, ♀: Ins. Philip.; Typus; *Obrimus echinatus* Stål, Type [NHRS].

- Kirby, 1904: 398.
- Redtenbacher, 1906: 41.
- Bruner, 1915: 229.
- Sjöstedt, 1933: 2. (Type data)

Aretaon (Trachyaretaon) echinatus, Rehn & Rehn, 1939: 423.

Trachyaretaon echinatus, Zompro, 2004: 212, fig. (in part – illustrated ♂ is *T. mangyan* **n. sp.**).

- Hennemann & Conle, 2006: 219, figs. 1-2, 5-6, 10 (in part – figures show *T. mangyan* **n. sp.**).
- Otte & Brock, 2005: 336.
- Lit & Eusebio, 2008a: 121. (Note on host plants)
- Baker, 2015: 3. (Pest status)
- Brock & Büscher, 2022: 522.

[**Not**: *Aretaon echinatus*, Zompro, 1996b: 453, fig 4. This is *T. mangyan* **n. sp.**]

[**Not**: *Trachyaretaon echinatus*, Bollens & Krijns, 2010: 18, figs. This is *T. mangyan* **n. sp.**]

[**Not**: *Trachyaretaon echinatus*, Harman, 2013: 26. (Note on culture stock). This relates to *T. mangyan* **n. sp.**]

Material examined

4 ♀, **1** ♂, **1** ♀ (penultimate instar): Philippinen, Northern Luzon Id., Mountain Province, Nueva Viscaya, Balite, leg. I.O. Lumawig VII.1996 [FH, No's 0497- 1 to 6];

2 ♀: Philippinen, Luzon Id., Prov. Aurora, Dingalan, local collector IX.2012 [FH, No's 0497-7 & 8];

1 ♀: Philippinen, N-Luzon Island, Sierra Madre, local collector III.2010 [FH, No. 0497-9];

5 ♀, **25** eggs: ex Zucht F. Hennemann III.2012, Herkunft: Philippinen, N-Luzon, Nueva Vizcaya Prov., Imugan Falls, leg. D. Navarro 2008 [FH, No's 0497-10 to 14 & E];

1 ♀: Philippines, Luzon, Quezon Prov., Mt. Palakong de Simbahan, 2010, leg. Bollens, Krijns [RBINS];

3 ♀, **2** ♂: Philippines, Luzon, Quezon Prov., Mt. Palakong de Simbahan, 2010, leg. Bollens, Krijns; ex culture Bresseel 2010 [RBINS];

2 ♀: Philippines, North Luzon, ex. Culture Bresseel 2010 [RBINS];

3 ♀, **3** eggs: Philippines, N. Luzon, ex breeding Holger Dräger [RBINS];

2 ♀, **2** ♂: Ex culture Holger Dräger, 2014; Origin: Philippines, Quezon province, Mt. Palakong, leg. R. Krijns & T. Bollens, iv.2010 [RBINS];

1 ♀, **1** ♂: Coll. I.R.Sc.N.B., Philippines, Luzon, Sorsogon, East Pocdol Mts. (400 m), x.2010, Leg. T. Heitzmann [RBINS].

Differentiation. – Females of *T. echinatus* species apparently come closest to *T. gatla* from Palawan, but a reliable differentiation is not possible since the original description of *gatla* is much insufficient and the type-specimen is not accessible for examination (see comments on *gatla* below). *Trachyaretaon echinatus* is well recognized by the strongly developed head and body armature and the prominently raised, multi-spinose posterior meso- and metanotals of ♀, which also have numerous definite spines on the abdominal terga II-VII (Fig. 59B-C, H, 60B). Morphologically these ♀ come closest to *T. mangyan* **n. sp**. from Mindoro but in addition to the characteristics mentioned above may be separated by the on average smaller size, more strongly narrowed anterior portion of the mesothorax (Fig. 59A), somewhat smaller median indention and less bi-lobed posterior margin of abdominal sternum VII (Fig. 59N) and more deeply indented posterior margin of the anal segment (Fig. 59M). Males most closely resemble *T. maliit* **n. sp**. but readily differ by the noticeably larger size and slenderer form with the mesothorax 2.3x longer than the prothorax and much more elongate

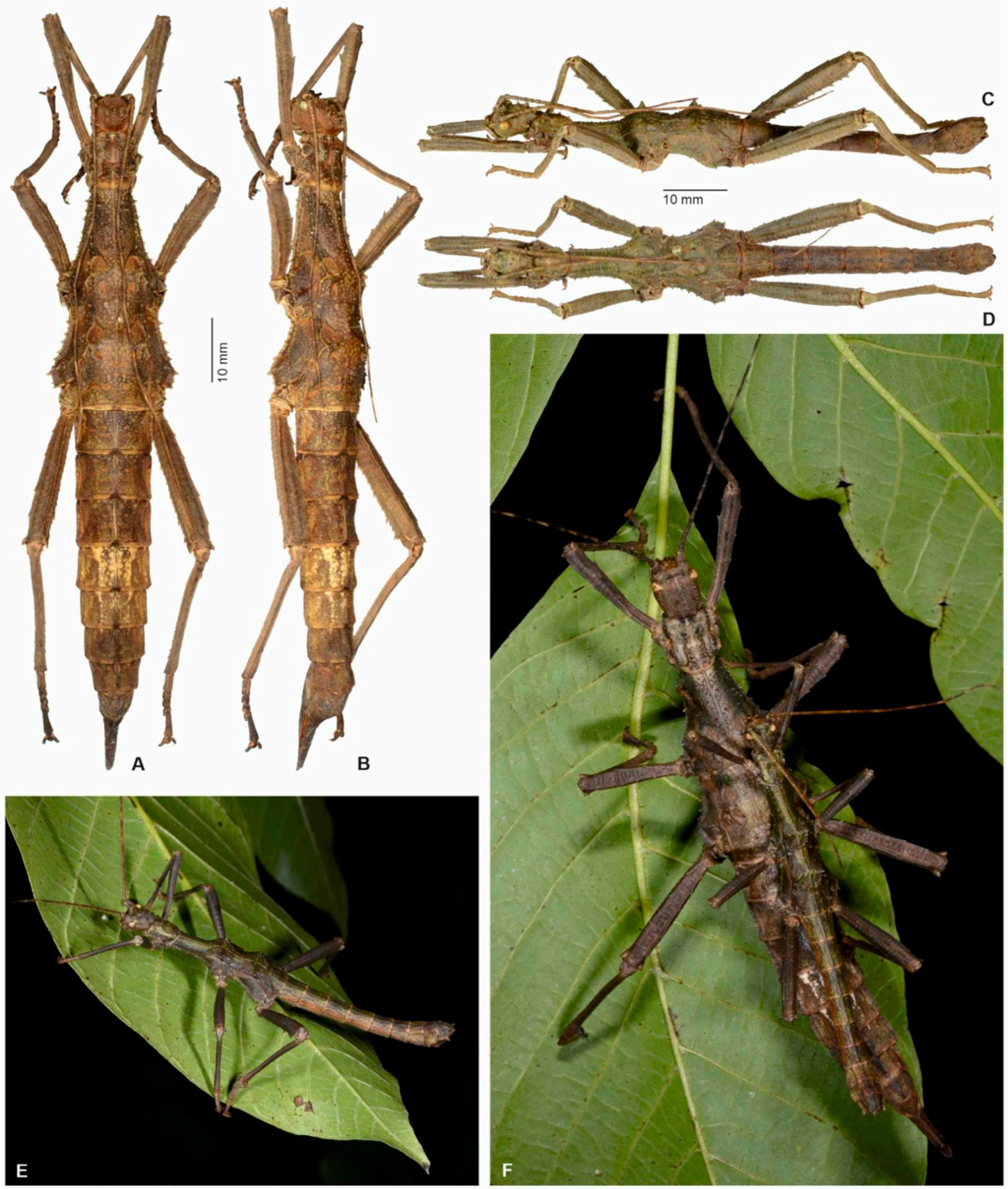

Fig. **58**. *Trachyaretaon carmelae* Lit & Eusebio, 2005 all captive reared from Babuyan Islands [FH].

– **A**. ♀ dorsal view [FH 0498-42]. – **B**. ♀ dorsolateral view [FH 0498-42]. – **C**. ♂ paratype, dorsal view [FH 0498-13]. – **D**. ♂ paratype, dorsolateral view [FH 0498-13]. – **E**. Live ♂. – **F**. Live couple.

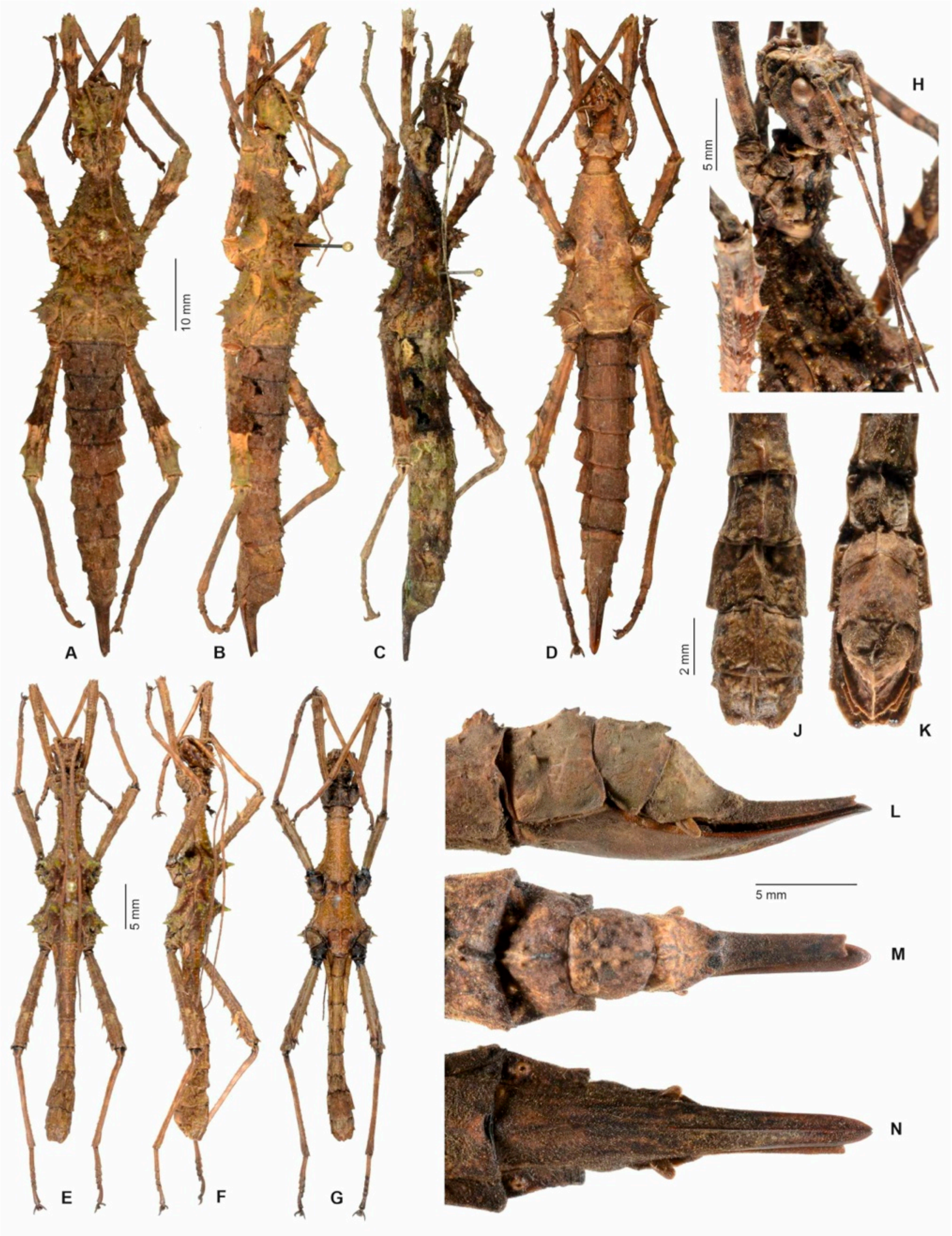

Fig. **59**. *Trachyaretaon echinatus* (Stål, 1877).

– **A**. ♀ dorsal view (N-Luzon, Mountain Province, Nueva Viscaya, Balite) [FH 0497-2]. – **B**. ♀ dorsolateral view (N-Luzon, Mountain Province, Nueva Viscaya, Balite) [FH 0497-2]. – **C**. ♀ dorsolateral view (reared from N-Luzon, Mountain Province) [FH 0497-12]. – **D**. ♀ ventral view (N-Luzon, Mountain Province, Nueva Viscaya, Balite) [FH 0497-2]. – **E**. ♂ dorsal view (S-Luzon, Mindoro Oriental Province, Baco) [FH 0497-10]. – **F**. ♂ dorsolateral view (S-Luzon, Mindoro Oriental Province, Baco) [FH 0497-10]. – **G**. ♂ ventral view (S-Luzon, Mindoro Oriental Province, Baco) [FH 0497-10]. – **H**. Head, pro- and mesothorax of ♀ in dorsolateral view (N-Luzon, Mountain Province, Nueva Viscaya, Balite) [FH 0497-5]. – **J**. Terminalia of ♂ in dorsal view [FH 0497-10]. – **K**. Terminalia of ♂ in ventral view [FH 0497-10]. – **L**. Terminalia of ♀ in lateral view [FH 0497-2]. – **M**. Terminalia of ♀ in dorsal view [FH 0497-5]. – **N**. Terminalia of ♀ in ventral view [FH 0497-5].

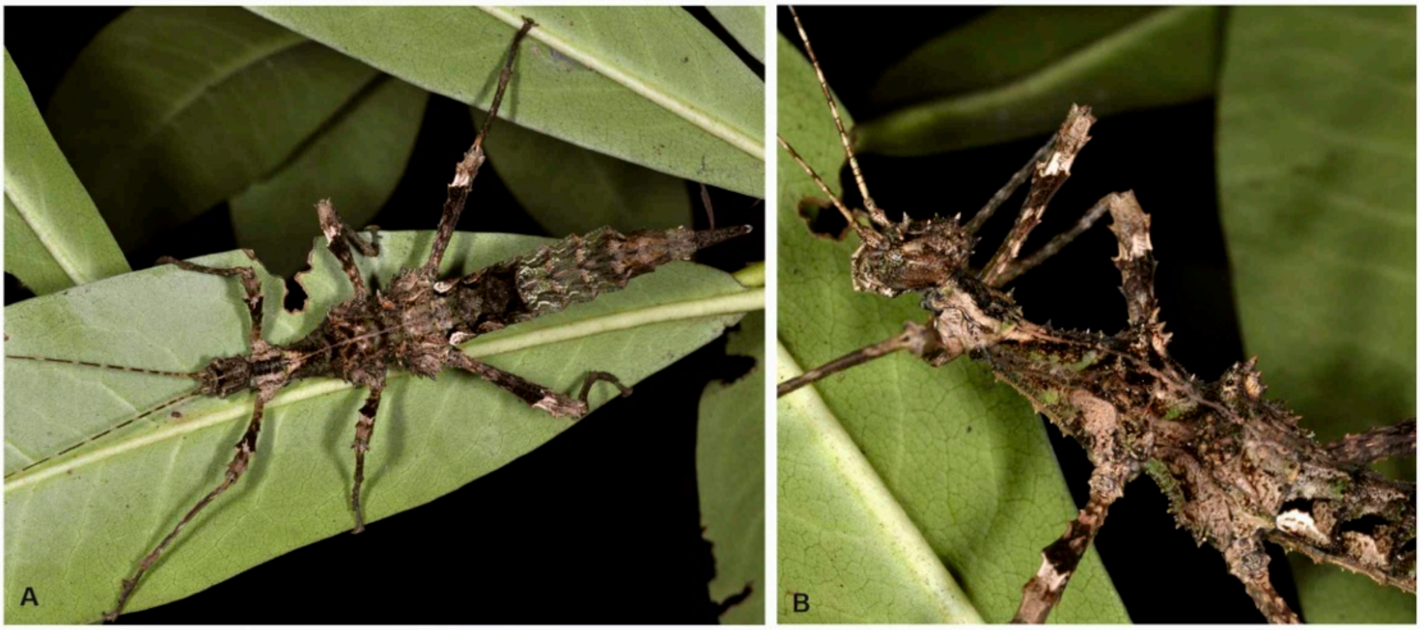

Fig. **60**. *Trachyaretaon echinatus* (Stål, 1877) Live reared ♀ from Mountain Province, N-Luzon [FH 0497-12]. – **A**. Habitus. – **B**. Closeup of head and thorax of same specimen.

(less than 2x the length of prothorax in *maliit*), lack of a posterolateral tooth of abdominal terga IV-VI (Fig. 59E), much smaller posteromedian excrescence of terga II-IX (Fig. 59F), considerably smaller epiproct which is almost wholly concealed under the anal segment (Fig. 59J-K), as well as the less developed armature of the extremities (metatibiae in particular).

Remarks. – Rehn & Rehn (1939: 423) recorded this species from Mount Banahao and Manila, Luzon as well as the islands of Sibuyan and Masbate. Since all their specimens are nymphs, it is not possible to assign them to *echinatus* or any other species with confirmation. Thus, these records are excluded from the list of localities below. The egg is formally described for the first time below. Body lengths: ♀ 71.0-86.0 mm, ♂ 47.0-48.0 mm.

Two culture stocks have been introduced to Europe. The first stock was collected by Dave Navarro in 2008 at Imugan Falls, Nueva Vizcaya Province in northern Luzon but only ♀ were found. This parthenogenetic stock was first successfully reared by Bruno Kneubühler (Switzerland) in 2009 and later on distributed as *Trachyaretoan* sp. 'North Luzon' (Fig. 60A-B). However, this stock appears to have vanished from the European phasmid breeding community. A second stock was collected along Marinfanta road, Quezon Province in 2010 and was first successfully reared by Tim Bollens (Herselt, Belgium) and Rob Krijns (Maastricht, Netherlands). This sexual stock was added to the Phasmid Study Group culture-list as culture No. 326 and is still being maintained in culture by various breeders. This species is easy to rear in humid conditions and will frequently accept bramble (*Rubus* spp., Rosaceae), beech (*Fagus sylvatica*, Fagaceae), oak (*Quercus robur*, Fagaceae), hazel (*Corylus avellana*, Betulaceae) and ivy (*Hedera helix*, Araliaceae) as alternative food plants.

Egg (Fig. 74C-D). – Rather small and elongate for the genus; capsule slightly bullet-shaped with the posterior half somewhat narrowing, slightly oval in cross-section; 2x longer than wide. Surface generally smooth but densely pitted; the anterior one-sixth and operculum covered with short setae. Micropylar plate fairly small and about 0.7x the length capsule; basically Y-shaped with the median portion slightly narrowing towards the anterior end and the two posterolateral extensions rather small, oval and extending on lateral surfaces of capsule almost at an angle of 90°; surface pitted like capsule and the outer margin notably inflated. Posterior portion widely V-shaped with a small bowl-shaped micropylar cup in centre. Median line distinct and formed by a narrow bulge that almost reaches to polar area. Operculum almost round and weakly convex; opercular angle ca 5°. General colour plain greyish mid brown, the setose anterior portion of capsule and operculum sepia brown; outer margin of micropylar plate blackish. Measurements [mm]: Length 4.1-4.2, width 2.0, height 2.3, length of micropylar plate 2.7.

Distribution. – Luzon, endemic. "Philippine Islands" [NHRS – type locality]. N-Luzon: Mountain Province (Balite [FH]); Province Nueva Vizcaya (Imugan Falls [RBINS, FH]); Province Aurora (Dingalan [FH]). S-Luzon: Province Quezon (Sierra Madre [FH]; Mount Palakong [RBINS]); Province Sorsogon (East Pocdol Mountains 400 m [RBINS].

Trachyaretaon gatla Zompro, 2004

Trachyaretaon gatla Zompro, 2004: 213, fig. 124b.

HT, ♀: Palawan Id., Palawan Prov., Port Barton, Waterfalls, 28.V. 1991 [OZ].

- Otte & Brock, 2005: 336.
- Hennemann & Conle, 2006: 219.
- Brock & Büscher, 2022: 522.

Remarks. – This species was described from a unique ♀ holotype, which unfortunately is deposited in the personal collection of O. Zompro (Berlin) and unfortunately is not accessible for examination. The insufficient description and availability of merely one habitus photo do not allow any proper taxonomic positioning of the species. The distinctive character "abdominal sternite VII with a notch posteromedially", that according to Zompro (2004: 214) separates this species from *T. echinatus* (Stål, 1877) does not properly distinguish *gatla* from this species or other congenerics, because all known species have a posteromedian notch or emargination on sternum VII. Nor does the eponymous characteristic feature mentioned "Supraanal plate with a notch posteromedially" help in distinguishing *gatla* reliably from other species, because this feature is seen to underlie slight variability within individual species and is also true also for *echinatus* and other species in the genus. Thus, the differentiation from *echinatus* given by Zompro is also not appropriate (i) due to the fact that the specimens listed and illustrated as *echinatus* (Zompro, 2004: 213, fig. 124a) were misidentified and actually represent *T. mangyan* **n. sp.**,

Keys to the species of *Trachyaretaon*

♂*

1. Medium to large insects (body length > 45.0 mm); mesothorax > 2x longer than prothorax 2

— Small (body length < 40.0 mm); mesothorax short and < 2x longer than prothorax (Fig. 62L); Luzon . . . . ***maliit* n. sp.**

2. Abdominal terga V-VIII at best with minute spines 3

— Abdominal terga V-VII with a distinct posteromedian lobe or excrescence (Fig. 59F); Luzon . . . . ***echinatus***

3. Abdominal sterna II-VI black 4

— Colouration of abdominal sterna II-VI not notably different from thoracic sterna 5

4. Rather small (body length < 60.0 mm); mesothorax 2.25x longer than prothorax; anal segment strongly narrowed towards posterior and without posterolateral impressions (Fig. 67K); Negros . . . . ***negrosanon* n. sp.**

— Larger species (body length > 60.0 mm); mesothorax 2.6x longer than prothorax; anal segment broader and with a distinct dorsal impression at each posterolateral angle (Fig. 69J); Panay . . . . ***tumandok* n. sp.**

5. Body length < 65.0 mm; colour heterogenous; ventral carinae of meso- and metafemora with distinct teeth 6

— Larger (body length > 65.0 mm); colour plain brownish olive (Fig. 58C-E); ventral carinae of meso- and metafemora minutely and densely denticulated; Babuyan Islands & NE-Luzon . . . . ***carmelae***

6. Medio-longitudinal carina of meso- and metasternum distinct; posterior margin of poculum entire and rounded 7

— Medio-longitudinal carina of meso- and metasternum shallow and obscure (Fig. 56H); posterior margin of Poculum bi-labiate with a median indention (Fig. 56F, 72N; Luzon . . . . ***bresseeli* n. sp.**

7. Mesothorax 2.8x longer than prothorax; posterior meso- and metanotals spinose and rather simple with only a few small tubercles around the base (fig. 66D); Luzon . . . . ***nakatago* n. sp.**

— Mesothorax 2.5x longer than prothorax; posterior meso- and metanotals truly composite with distinctspiniform tubercles around the base (Fig. 64G); Mindoro . . . . ***mangyan* n. sp.**

* ♂ of *T. gatla* Zompro, 2004 is not known.

♀*

1. Anal segment with a posteromedian notch or indention and ± bilobed 2

— Anal segment almost entire and rounded, not clearly notched medially (Fig. 67N); Negros . . . . ***negrosanon* n. sp.**

2. Body length > 70.0 mm; abdominal terga IV-VII not lobed posterolaterally or posteromedially 3

— Small species (body length < 60.0 mm); abdominal terga IV-VII with a distinct dentate lobe at posterolateral angles and a crenulate lobe posteromedially (Fig. 61E-G); Luzon . . . . ***maliit* n. sp.**

3. Posterior meso- and metanotals prominently raised, peg-like in shape and multi-spinose; metanotum with a distinct pair of anterior spines; abdominal terga II-VII multi-spinulose 4

— Body armature less developed; posterior meso- and metanotals low, conical in shape and at best multi-tuberculose; no anterior pair of spines on metanotum; abdominal terga unarmed or at best with a minute pair of latero-anterior and posterior tubercles 5

4 (**). Luzon (Fig. 59-60) . . . . ***echinatus***

— Palawan . . . . ***gatla***

5. Body length < 90.0 mm; mesonotum with a distinct pale triangular anterior marking 6

— Body length > 90.0 mm; no or at best a weakly indicated pale anterior marking on mesonotum 7

6. Femora distinctly incrassate and teeth remarkably large (Fig. 55A-E); medio-longitudinal carina of meso-and metasternum very obscure to almost wanting (Fig. 56G); Luzon . . . . ***bresseeli* n. sp.**

— Femora slenderer with teeth just moderately sized; medio-longitudinal carina of meso- and metsternum distinct and acute (Fig. 71B); Mindoro . . . . ***mangyan* n. sp.**

7. Posterior meso- and metanotals multi-tuberculose conical protuberances; ventral carinae of meso- and metafemora with 5-6 distinct teeth that increase in size towards the apex of femur 8

— Posterior meso- and metanotals only represented by low tubercles (Fig. 58B); ventral carinae of meso- and metafemora minutely and densely denticulated; Babuyan Islands & NE-Luzon . . . . ***carmelae***

8. Stocky species; anterior pronotals distinct, conical and almost equal in size to posterior pronotals (Fig. 69G); epiproct ± reaching to tip of subgenital plate (Fig. 69K-M); Panay . . . . ***tumandok* n. sp.**

— Slenderer in shape; posterior pronotals distinct, spinose and notably larger than anterior pronotals (Fig. 65G); subgenital plate notably surpassing epiproct (Fig. 65F); Luzon . . . . ***nakatago* n. sp.**

* Morphological distinction not possible (see comment on *T. gatla* Zompro, 2004 below).

and (ii) a posteromedially notched apex of the epiproct is clearly present in *echinatus*. In all aspects mentioned in the brief original description and what can be seen from the unique photo available, *gatla* morphologically agrees with *T. echinatus*. Hence, the distribution in Palawan, which however deserves evaluation, is the only fact that can presently serve for separation of *gatla* from *echinatus*. The ♂ and egg are not known. Body length ♀ 71.3 mm.

Distribution. – Palawan.

Trachyaretaon maliit **n. sp.**

(Fig. 61-63, 71C & 72K)

ZooBank: https://zoobank.org/6D1EF327-0407-46C1-8B63-5788F7D80161

HT, ♂: Coll. I.R. Sc.N.B., Philippines, Luzon, Quirino, Sierra Madre, X. 2014, local collector, gift B. Kneubühler 2015 [RBINS].

PT, **2** ♀, **1** ♂: Coll. I.R. Sc.N.B., Philippines, Luzon, Mt. Prov, Bontoc-Barlig, 1500-2000m, 17°1'48"N 121°14'48"E, 12.iv.2014, IG: 32700, Mission Leopold III funds, Constant J., Bresseel J. & Co. [RBINS].

PT, ♀: Philippines, Benguet, Mount Pack, leg. T. Heitzmann & A. Kang, IV.2013 [RBINS].

PT, ♂: Philippines, North Luzon, Mt. Province, Mt. Barlig, VI.2013 [RBINS].

PT, ♀ (penultimate instar): Philippines, Luzon, Mountain Province, Mt. Polis, 3.VIII.2013, leg. T. Heitzmann & J.P. Ortega, I.G.: 32.267 [RBINS].

PT, ♂: Philippinen, Northern Luzon Id., Mountain Province, Nueva Vizcaya, Balite, leg. I.O. Lumawig VII.1996 [FH, No. 1454-1].

PT, ♂: Philippinen, S-Luzon Id., Bicol Region, Provinz Sorsogon, Mount Bulusan, local collector IX.2012 [FH, No. 1454-2].

Differentiation. – This very distinctive new species is the smallest known representative of the genus and therefore readily separated from all other congenerics by the small size but also by the mostly green colour and mossy general appearance (Fig. 63A-B) as well as the distinct dentiform posterolateral angle of the abdominal terga (♀ in particular, Fig. 61). The ♀ most closely resembles that of the type-species *T. echinatus*, which also occurs on Luzon, but in addition to the much smaller size clearly differs by the much stockier shape and relatively shorter body segments, much lower composite posterior mesonotals and metanotals (Fig. 61D) but comparatively stronger pre-median and median mesonotals (Fig. 60D) as well as the notably larger ventral dentations of the metatibiae. The ♂ can be separated from all other known species in the genus by the short mesothorax, which is less than 2x longer than the prothorax (Fig. 62L) as well as the triangular dentiform posterolateral projection of abdominal terga V-VII, the posterolateral lobe of terga VIII and IX and long epiproct, which considerably projects over the posterior margin of the anal segment (Fig. 62E-G, K). The characteristic laterally compressed posteromedian projection of abdominal terga, which is most prominent on V-VIII, is only shared with *T. echinatus*, but in this new species it is often much more developed (Fig. 62B).

Etymology. – The name *maliit* (Tagalog = small) refers to the very small size of this new species. Tagalog is the language of the Tagalog people, the largest ethnolinguistic group of indigenous people in the Philippines, who live throughout most of the regions of Luzon.

Description

The colouration is described from the dried specimens and photos of the insects when alive. Most of the dried specimens are discoloured to buff and ochre due to provisional preservation in ethanol.

♀ (Fig. 61)

Form and colouration. – Small (body length 53.1-59.5 mm) and stocky for the genus with strongly developed body armature and fairly low, multi-tuberculated posterior meso- and metanotals; body surface sparsely and unevenly tuberculate and with a fine medio-longitudinal dorsal carina that is raised into a posterior excrescence on abdominal terga. General colour various tones green, olive and ochre (the dried specimens rather drab to brown); lateral portions of meso- and metanotum with some sepia brown and abdominal terga VI-VIII with dark brown to blackish mottling laterally; abdomen occasionally with a pale medio-longitudinal stripe and tergum V sometimes lighter in colour and rather creamy grey. Ventral body surface fairly plain buff to ochre. Frons with two roughly triangular dark brown markings. Eyes fuscous, antennae drab with some light cream-coloured annuli. Legs with some irregular dark brown mottling.

Head. – As typical for the genus with the vertex moderately inflated and roundly convex (Fig. 61D), scarcely longer than wide and broadest at the eyes; these large, projecting subhemispherically and diameter of eyes contained about 1.4x in length of gena. Supra-antennals strong and with a smaller interior spine at the base; only a rather small anterior pair of medial occipitals present and the genae with two gulars, of which the anterior one is tuberculiform and the posterior one spiniform. Median coronals prominent, conical and moderately pointed but notably smaller than the strong lateral coronals. Supra-orbitals very strong and conical and similar in size to the posterior pair of supra-orbitals; the pair of occipital medials much smaller and vertex in front with four small tubercles that roughly forma quadrate. Antennae reaching to abdominal segment V and consisting of 26 joints; scapus rather compressed dorso-ventrally and roundly rectangular in outline; pedicellus much shorter and round in cross-section; III much longer than pedicellus, the proceeding increasingly elongated and the terminal joints somewhat shortening.

Thorax. – Pronotum about as long but narrower than head, longer than wide, lateral margins with a distinct, almost semi-circular excavation pre-medially, the transverse median sulcus moderately impressed and just gently arched. Anterior margin only with small tubercles; the anterior portion with a strong and conical but rather short pair of anterior pronotals, the posterior half with several rather irregularly dispersed small and obtuse subtuberculose medials; posterior pronotals distinct and the largest of the pronotal spines; postero-laterals small and conical (Fig. 61D). Mesothorax gradually ascendant and strongly widened towards the posterior, shape strongly trapezoidal with posterior margin about 2.2x wider than anterior margin; 1.7x longer than prothorax. Mesonotum less trapezoidal in outline but still notably narrowing towards the anterior; surface with a large and conical pair of pre-medial tubercles and four more closely spaced and similarly but somewhat unequally sized median tubercles; the lateral margins with 6-7 short and moderately distinct spiniform tubercles; posterior mesonotals rather low, obtusely conical, multi-tuberculated swellings with the central tubercle somewhat enlarged (Fig. 61D). Mesopleurae increasingly widened towards posterior and with a low and obtusely conical, multi-tuberculated mesopleural; surface minutely tuberculated and with four strong, conical tubercles, that slightly increase in size towards the posterior. Metanotum notably narrowed anteriorly with the posterior margin distinctly emarginated and {-shaped; roughly in centre with a pair of large, obtusely conical tubercles; the posterior metanotals similar to posterior mesonotals but slightly more raised (Fig. 61D). Metapleural a fairly large, unevenly shaped and multi-tuberculated swelling; the margins unevenly tuberculated and with about four tubercles somewhat enlarged. Meso- and metasternum (Fig. 61C) each with a shallow, transverse posteromedian swelling that is covered by some glossy granules; mesosternum with a lateral row of four rather prominent but low, conical tubercles and about six paired knob-like tubercles medially; metasternum only with a single somewhat pronounced lateral tubercles and some scattered, unequally sized tubercles and nodes medially (Fig. 71C).

Abdomen. – Median segment basically semi-circular but with anterior margin {-shaped; surface only with a small tuberculiform anteriors and medials, the posterior margin with six small conical tubercles. Segments II-VII just slightly subequal in length and all distinctly transverse; II-VII somewhat widening, V widest and 3x wider than long, VI-VIII gradually narrowing; terga III-VII with posterolateral angle protruded into a bi- or tri-dentate angular lobe, which is most prominent on VIV-VI (Fig. 61A-C). Terga all with a medio-longitudinal carina that posteriorly terminates in a crenulate laterally compressed excrescence, which gradually increases in size from II-VII (Fig. 61G). Terga II-VIII otherwise only with a small pair of latero-anterior tubercles, a notably smaller pair of anteriors and slender first and second paired posterior spines at posterior margin, the interior (first) pair of

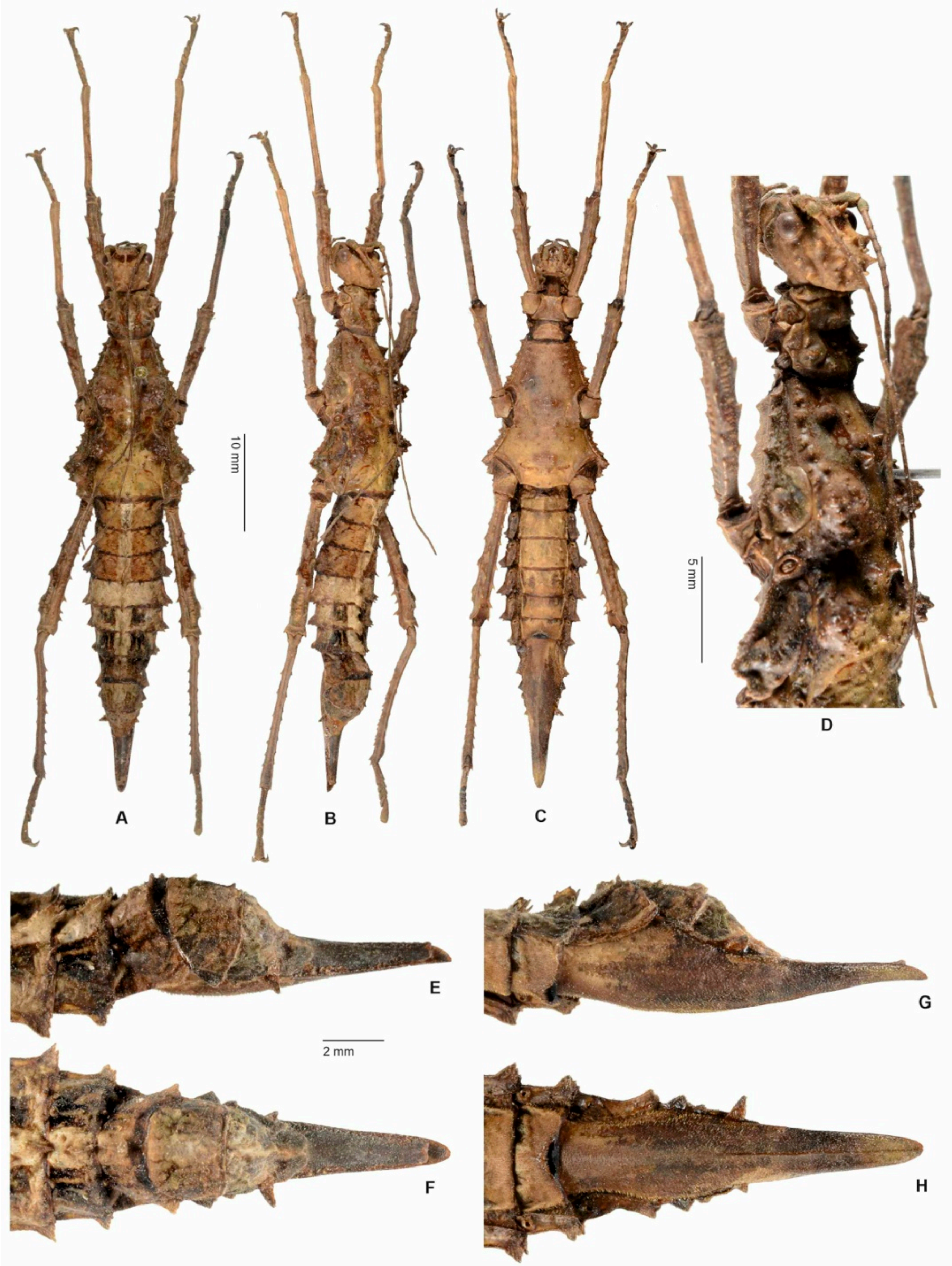

Fig. 61. *Trachyaretaon maliit* **n. sp.** ♀ holotype [RBINS].

– **A**. Habitus dorsal view. – **B**. Habitus dorsolateral view. – **C**. Habitus ventral view. – **D**. Head and thorax in dorsolateral view. – **E**. Terminalia in dorsolateral view. – **F**. Terminalia in dorsal view. – **G**. Terminalia in ventrolateral view. – **H**. Terminalia in lateral view.

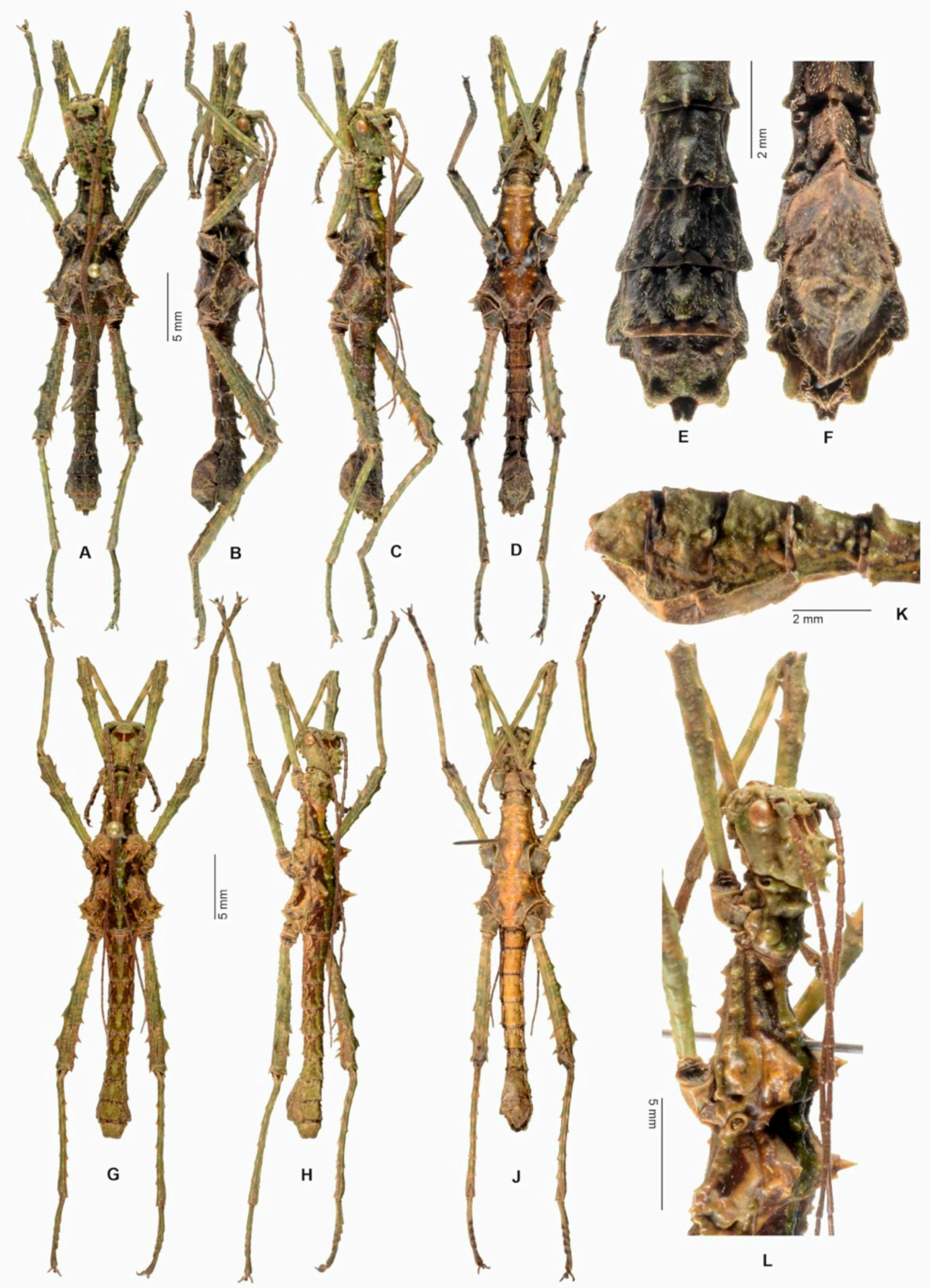

Fig. **62**. *Trachyaretaon maliit* **n**. **sp**. ♂.

– **A**. Habitus of paratype in dorsal view [FH 1454-1]. – **B**. Habitus of paratype in lateral view [FH 1454-1]. – **C**. Habitus of paratype in dorsolateral view [FH 1454-1]. – **D**. Habitus of paratype in ventral view [FH 1454-1]. – **E**. Terminalia of paratype in dorsal view [FH 1454-1]. – **F**. Terminalia of paratype in ventral view [FH 1454-1]. – **G**. Habitus of paratype in dorsal view [RBINS]. – **H**. Habitus of paratype in dorsolateral view [RBINS]. – **J**. Habitus of paratype in ventral view [RBINS]. – **K**. Terminalia of paratype in dorsolateral view [RBINS]. – **L**. Head and thorax of paratype in dorsolateral view [RBINS].

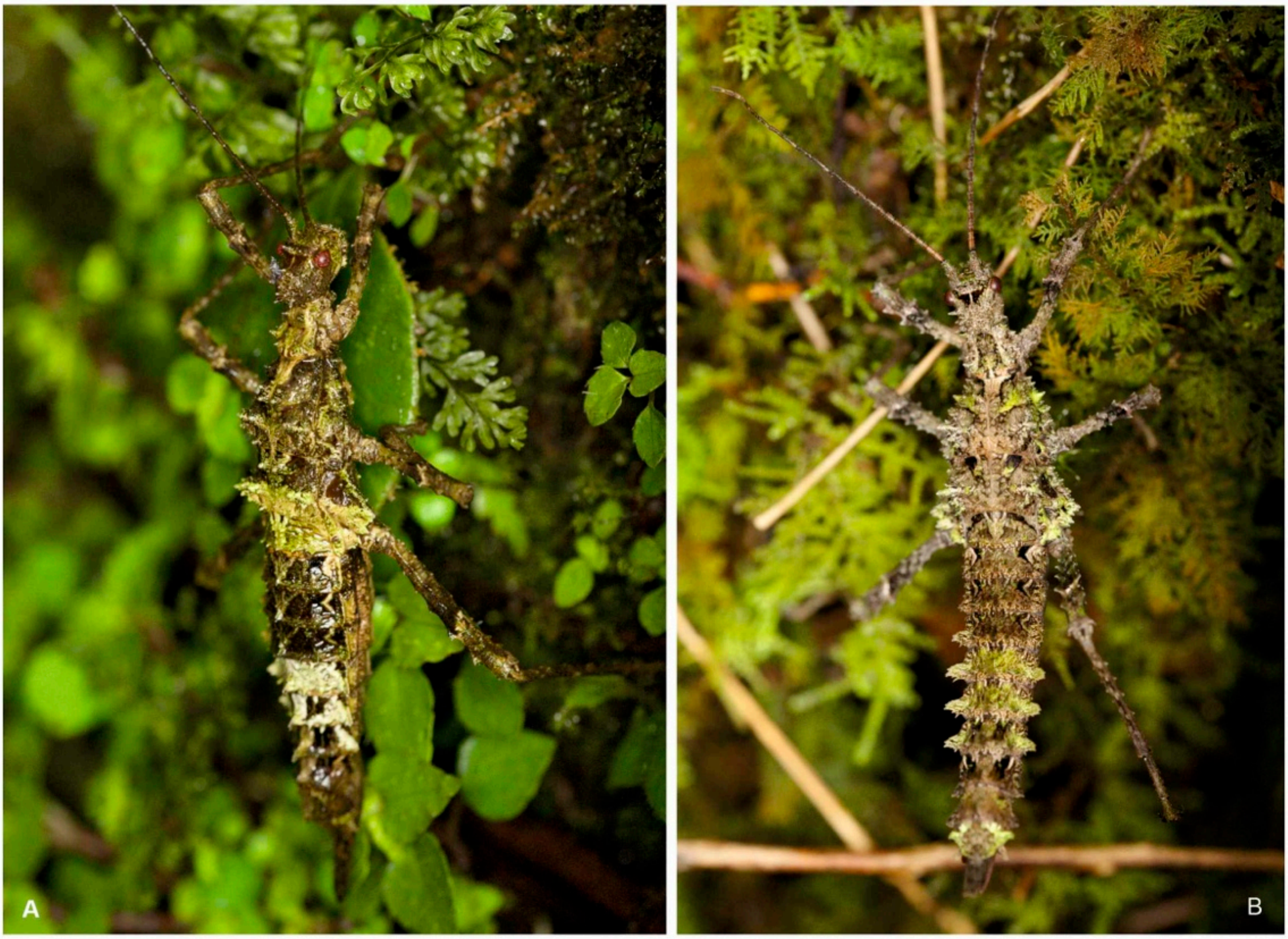

Fig. 63. *Trachyaretaon maliit* **n**. **sp**. Live insects at the type-locality Bontoc-Barlig, Mountain Province, Luzon in April 2014 [© Anne Lefevre]. – **A**. ♀ paratype. – **B**. Penulimate instar ♀ paratype showing stunning camouflage in the mossy natural habitat.

which is somewhat more pronounced; these also increasing in size from II-VII. Sterna smooth except for an antero-lateral pair of obtuse tubercles (Fig. 61C). Sternum VII ascendant medially with posterior margin raised, widely emarginated and with the inter portion glossy (Fig. 61G-H). Terga VIII and IX with posterolateral angles just slightly deflexed and obtusely triangular (Fig. 61F); IX with a distinct pair of latero-anterior tubercles and two small tubercles at posterior margin (Fig. 61E). Anal segment progressively narrowing, strongly descendant and obtusely tectate medio-longitudinally; the posterior margin roundly angular and with a very shallow median indention (Fig. 61F). Cerci small, conical and compressed laterally. Epiproct just very scarcely up-curved, about 1.7x longer than anal segment, weakly tectate longitudinally and slightly gradually narrowing towards a weakly notched apex (Fig. 61F). Subgenital plate long, lanceolate and distinctly keeled in the apical half; the apex fairly pointed, slightly surpassing tip of epiproct and with tip slightly downward directed (Fig. 61E-H).

Legs. – Of moderate length with all carinae armed except for the dorsal carinae of the meso- and metatibia which are smooth. Ventral carinae of tibiae only with small dentations, although those of the metatibiae are more numerous, notably more pronounced and acutely pointed. Exterior ventral carinae of meso- and metafemora with 6-7 distinct teeth and a few much smaller intercalated teeth, which become increasingly more spiniform towards the apex of femur (metafemora in particular); the dorsal carinae with five broad teeth that strongly decrease in size towards the base of femur with the two apical ones very prominent and broad. Medioventral carina of meso- and metafemora only marked by some small granules. Tarsi rather elongate and more than half the length corresponding tibia; basitarsi elongate almost as long as proceeding three tarsomeres taken together.

♂ (Fig. 62)

Form and colouration. – Size very small for the genus (body length 35.7-40.7 mm), general form rather stocky with a very short mesothorax that is only 1.8x longer than the prothorax and with a distinct posteromedian lobe on abdominal terga II-VII (V-VII in particular). Colouration rather complex and moss-like; basically, dark green to olive with lateral portions of meso- and metanotum and pleurae and abdominal terga rather brown; mesonotum, metanotum and occasionally also abdominal terga I-VII with a distinct and broad green medio-longitudinal streak. Meso- and metasternum mostly dark yellowish to ochre with the lateral regions greyish to black. Most of the thoracic tubercles and spines ochre to dull orange. Frons with a pair of triangular fuscous markings. Legs olive with faint, irregular brown and ochraceous mottling; the mottling rather orangey on ventral surfaces of metafemora and tibiae. Eyes dark orange. Antennae with two basal joints olive, all other joints reddish mid brown.

Head. – Shape and armature essentially as in ♀ but eyes larger and projecting almost hemispherically (Fig. 62L). Antennae basically in ♀ but reaching to abdominal segment VI.

Thorax. – Pronotum shorter and narrower than head and slightly longer than wide. Armature principally as in ♀, but anterior margin unarmed, the posterior half with four small subtuberculose medial pronotals that are roughly arranged in a quadrate, and the posterior pronotals distinct but slightly smaller than the anterior pronotals (Fig. 62L). Mesothorax short and broad, only 1.8x longer than prothorax with the posterior portion strongly inflated and widened. Mesonotum only with a moderate subspinose pair of anterior mesonotals, three clustered median mesonotals and three small tubercles along lateral margins; posterior mesonotals prominent, tuberculose and with a prominent spine in centre which has an irregular and obtuse keel anteriorly and posteriorly (Fig. 62L). Posterior metanotals like mesonotals but somewhat larger; a low and conical pair of median metanotals present; metanotum strongly inflated posteriorly and narrowed anteriorly (Fig. 62L). Meso- and metaplaeurae increasingly deflexed and inflated towards the posterior; meso- and metapleural moderately developed, obtuse and with smaller tubercle above. Mesopleurae with three somewhat enlarged tubercles of which the antero-lateral is the most distinct one and slightly spiniform. Metapleurae with two prominent, irregularly carinated supra-coxals and only some small lateral tubercles. Mesosternum sparsely granulate with six fairly prominent but low and conical mesosternals; metasternum with four much smaller metasternal (Fig. 62D, J).

Abdomen. – Median segment trapezoidal and with a small tuberculiform pair of first paired posteriors at posterior margin. Segment II distinctly trapezoidal, III-VII roughly uniform in width, subquadrate and weakly subequal in length. Terga III-IX each with the posterolateral angle protruded into an obtusely triangular, dentiform projection and with a node-like pair of anterior tubercles. II-VII with fairly small and obtuse first and second paired posteriors and a much more prominent posterior mesal; the latter laterally compressed, gradually increasing in size from II towards VII and most prominent and tridentate on VI; on VII lower but much broader than on preceding terga (variable in size and shape, Fig. 62K)). Sterna II-VII with a fine but fairly acute mediolongitudinal carina and a pair of anterior tubercles, which is most pronounced in II. Terga VIII and IX each with a bi-tuberculose posteromedian protrusion; the first and second paired posteriors obtuse (Fig. 62E-F). Anal segment with a distinct, bluntly triangular, dentiform latero-basal projection and strongly narrowed in the posterior half; the posterior margin somewhat inflated and with a distinct almost semi-circular median excavation; dorsally with a shallow impression near each posterolateral angle (Fig. 62E). Epiproct large, elongate, bi-fid at the apex and notably projecting beyond anal segment (Fig. 62E-F). Vomer dark orange, broadly triangular and gradually tapering towards a moderately long but rather obtuse terminal hook, that is dextral-directed by about 30°; basal portion somewhat impressed medially (Fig. 72K). Cerci strongly compressed laterally, small. Poculum large, rounded, bulgy with the posterior margin broadly triangular and strongly labiate to form a fairly broad flange; vertical posterior portion with a fine median carina (Fig. 62F).

Legs. – Basically, as in ♀ but tarsi relatively more elongate and slenderer, the basitarsi about as long as proceeding three tarsomeres taken together.

Variability. – Slight variability is seen in the size, colouration and degree of the cephalic, thoracic and abdominal armature as well as the dentations of the limbs. Colour variation is summarized in the descriptions above. It is noteworthy that the ♂ from Mount Bulusan is smaller than all other known specimens (body length 35.7 mm) and has the posteromedian excrescence of abdominal terga IV-VII notably more developed.

Remarks. – Eggs unknown.

Distribution. – Luzon.

Trachyaretaon mangyan n. sp.

(Fig. 64 & 74N-O)

ZooBank: https://zoobank.org/220EF9F7-8E8A-4A3F-A398-7FDF5E8EA0A2

Aretaon echinatus, Zompro, 1996b: 453, fig 4. (Misidentification).
Trachyaretaon echinatus, Zompro, 2004: 212, fig. (in part – only the illustrated ♂ from Mindoro).

- Hennemann & Conle, 2006: 219, figs. 1-2, 5-6, 10 (in part – figures show *T. mangyan* **n. sp.**).

HT, ♀: Philippinen, Mindoro Island, Mount Halcon, leg. Noel Mohagan 14.IV.-15.V.1996 [RBINS, ex coll. FH].

PT, ♂: Philippinen, Mindoro Island, Mount Halcon, leg. Noel Mohagan 14.IV.-15.V.1996 [RBINS, ex coll. FH].

PT, **5** ♀, **9** ♂, **4** ♀ (penultimate instar), 8 ♀ (juvenile), 4 eggs: Philippinen, Mindoro Island, Mount Halcon, leg. Noel Mohagan 14.IV.-15.V.1996 [FH, No's 0119-1 to 26, E1].

Differentiation. – Morphologically, this new species comes closest to the Luzonese *T. bresseeli* **n. sp.** but is endemic to the island of Mindoro, which represents a biogeographic realm of its own within the Philippine archipelago. With *bresseeli* it shares the stocky overall shape and rather poorly developed body armature. Females are very similar and may only be separated by the much more distinct and acute mediolongitudinal carina on the meso- and metasternum (Fig. 71B), broader posteromedian emargination of abdominal sternum VII (Fig. 71J), somewhat smaller and narrower posteromedian notch of the anal segment (Fig. 71H) and the less incrassate femora which have all the dentations considerably smaller and less developed. Males can be distinguished by the notably more pronounced and more acute mediolongitudinal carina of the meso- and metasternum, less incrassate metafemora, narrower and basally less expanded anal segment (Fig. 64L), rounded posterior margin of the poculum (Fig, 64M, bi-lobate and indented medially in *bresseeli*) as well as the shape of the vomer, which has the base smaller and the terminal hook notably longer. The eggs (Fig. 74N-O) represent the most reliable distinction from *bresseeli* and clearly separate *mangaya* **n. sp.** by having the posterolateral extension of the micropylar very large and expanded towards the anterior.
From the type-species *T. echinatus*, which also occurs only on Luzon, this new species differs by a good number of characters. Both sexes of *T. mangyan* **n. sp.** are comparatively larger (♂ in particular) and have the head and body armature much less developed with the composite posterior meso- and metanotals noticeably lower, merely conical in

	♂, **HT** [RBINS]	♂, **PT**	♀, **PT**
Body	40.7	35.7-38.8	53.1-59.5
Pronotum	2.9	2.6-3.3	4.0-4.3
Mesonotum	6.3	5.7-6.2	7.2-7.9
Metanotum	4.0	3.8-4.0	4.9-5.3
Median segment	2.7	2.6-2.8	3.3-3.8
Profemora	10.0	8.9-9.4	10.3-10.9
Mesofemora	9.4	8.9-8.4	9.5-10.0
Metafemora	12.6	10.6-12.0	13.8-14.2
Protibiae	10.8	9.2-10.56	12.1-12.2
Mesotibiae	10.0	8.7-9.3	11.1-11.4
Metatibia	13.2	11.3-12.1	15.0-16.7
Antennae	32.0	27.5-30.7	32.7-36.0

Table 8. Measurements of *Trachyaretaon maliit* **n. sp.**

basic shape and only multi-tuberculated (Fig. 64B, E, G), whereas these are strongly raised and rather peg-shaped and multi-spinose in *echinatus*. Females can be distinguished by the very indistinct pair of anterior metonotals (prominent in *echinatus*), lack of spines on the abdominal terga (Fig. 64B), lack of the posteromedian protrusion on abdominal terga VIII and IX, having the median notch of the anal segment comparatively broader and the notch at the tip of the epiproct less obvious (Fig. 64H). Males are readily separable from those of *echinatus* by lacking the distinct, dentiform posteromedian protrusion of abdominal terga V-VIII (Fig. 64E), presence of a rounded impression near each posterolateral angle of the anal segment (Fig. 64L), more broadly rounded posterior margin of the poculum (Fig. 64M, rather triangular in *echinatus*), slightly different shape of the vomer and lacking the black coxae frequently seen in *echinatus*.

Interestingly, the eggs resemble those of *T. negrosanon* **n. sp.** and *T. tumandok* **n. sp.** in having the posterolateral expansions of the micropylar plate very large and expanded towards the anterior (Fig. 74N-O), thereby readily differing from eggs of *echinatus* in which the posterolateral extensions of the micropylar plate are small, simple and slightly posterior-directed (Fig. 74C-D). From those of *negrosanon* these eggs may be distinguished by being somewhat less elongate, the lateral lobes of the micropylar plate being larger and broader and the setae in the anterior portion of the capsule and on the operculum being much shorter and less numerous. From *T. tumandok* they differ by the much lighter greyish overall colour, notably larger and broader lateral lobes of the micropylar plate and mire developed and more numerous setae in the anterior portion of the capsule and on the operculum.

Etymology. – Mangyan is the generic name for the eight indigenous groups of people who live on the island of Mindoro, the type-locality of this new species.

Description

The colouration of this large and stocky species is described from dried specimens only.

♀ (Fig. 64A-B)

Form and colouration. – Moderately sized (body length 80.0-87.0 mm) and of stocky shape for the genus with rather weakly developed body armature and fairly low, but conical and multi-tuberculated posterior meso- and metanotals; body surface sparsely and unevenly tuberculate and with a fine medio-longitudinal carina. General colour variable, mostly various tones of mid to dark brown and occasionally with some dark green and olive, and irregularly speckled with darker; lateral surfaces of abdominal terga II-VII with characteristic inversely V-shaped black marking and sometimes with a triangular black anterior lateral marking on tergum VIII. Two specimens have a pale cream-coloured triangular anterior marking on the mesonotum in of which the marking extends into a medio-longitudinal streak that practically runs along the entire dorsal body surface but becomes increasingly less distinct on the abdomen. Two faint roughly triangular dark brown markings on frons. Eyes dark ochre, antennae dark brown with some light cream-coloured annuli.

Head. – Scarcely longer than wide with vertex moderately inflated, conically rounded and slightly projecting over anterior margin of pronotum; surface sparsely set with granules. Supra-antennals distinct and acutely pointed with some smaller tuberculiform granules around the base; supra-orbitals smaller and rather obtuse; genae with a few irregularly placed, small and rather node-like gulars. The four coronals roughly equal in size, strong and conical; two strong supra-orbitals present that are roughly equal in size to the median coronals; anterior portion of vertex with several variably sized blunt occipital medial tubercles. Eyes strongly projecting and their diameter contained a little more than 2x in length of genae. Antennae with about 26 joints and reaching to posterior margin of abdominal segment III; the median antennomeres strongly elongated.

Thorax. – Pronotum about as long and wide as head and weakly trapezoidal in outline with the anterior margin somewhat deflexed; the transverse median sulcus shallow, gently arched and expanding almost over entire width of segment; surface sparsely and unevenly nodulose. The prominent pair of posterior pronotals represent the largest of the pronotal spines and are strong and conical; anterior portion only with an indistinct and low pair of posterior mesal pronotals, the antero-lateral pronotals small and obtusely conical, the inter-posterior pronotals only represented by small tubercles. Mesothorax gradually ascendant and widened towards the posterior, shape strongly trapezoidal with posterior margin about 2.3x wider than anterior margin; 2.1x longer than prothorax (Fig. 64A). Mesonotum slightly trapezoidal in outline and only with one or two small pairs of conical post-median mesonotal tubercles (occasional also a small pair of anterior tubercles present); posterior mesonotals rather low, conical and multi-tuberculated with the median tubercle somewhat enlarged, strong and conical (Fig. 64B). Lateral margins unevenly tuberculated. Mesopleurae increasingly widened towards posterior and with a strong and conical mesopleural; the antero-lateral, medio-lateral and two of the supra-coxals somewhat enlarged and bluntly spiniform; surface otherwise tuberculated. Metanotum subquadrate with a narrowing medially, the posterior metanotals like those of the mesonotum (Fig. 64B); in front with a slightly enlarged pair of anterior metanotal tubercles. Metapleural small, the lateral margin unevenly tuberculated and with a strong median supra-coxal; a much smaller supra-coxal present in front and near posterior margin and two slightly enlarged, conical laterals present. Meso- and metasternum with an obtuse medio-longitudinal keel, surface otherwise sparsely granulose; mesosternum with six paired very low and obtuse mesosternals and metasternum only with six small node-like tubercles and median pair posteriorly (Fig. 71B).

Abdomen. – Median segment almost semi-circular in shape with anterior margin widely rounded; the four posteriors only represented by small nodes, surface otherwise only with some small paired nodes. Segments II-IV roughly uniform in width and length, VI-X narrowing with VI and VII slightly decreasing in length; on average II-V about 2.3x wider than long. Lateral margins of terga V-VII somewhat deflexed and obtusely angular posteriorly; surface of II-V only with a very indistinct pair of latero-anterior and latero-posterior tubercles, otherwise smooth (Fig. 64B) to very sparsely set with some granules but medio-longitudinal carinae increasingly pronounced on V-IX. Sterna smooth except for an anterior and posterior pair of granules. Praeopercular organ formed by a moderately broad, roughly semi-circular median excavation of posterior margin of sternum VII, which otherwise is slightly deflexed and rounded on each side of the median excavation (Fig. 64J). Terga VIII and IX each with a low and obtuse posteromedian swelling that is formed by an excrescence of the medio-longitudinal carina; lateral margins of VIII gently rounded. Anal segment progressively narrowing; the anterior two-thirds strongly descendant and with a distinct and obtuse medio-longitudinal bulge; the posterior margin somewhat inflated and bi-lobate with a wide, triangular indention medially (Fig. 64H). Epiproct straight in lateral aspect, about 1.7x longer than anal segment, weakly tectate longitudinally and slightly gradually narrowing towards an obtusely rounded to weakly notched apex (Fig. 64H). Subgenital plate long, lanceolate and distinctly keeled in the apical half; the apex fairly pointed and slightly surpassing tip of epiproct (Fig. 64H-J).

Legs. – Moderately long and slender for the genus, the meso- and metafemora somewhat incrassated subapically. Basal flexure and constriction of profemora moderately developed; the anteroventral carina with two distinct triangular teeth in apical one-third; posteroventral carina only with three slightly indicated teeth; dorsal carinae each with five low teeth that slightly increase in size towards the base of femur, the apical one being most distinct and much broadened. All four carinae of meso- and metafemora with five teeth that become larger towards the apex of femur; those on the ventral carinae acutely triangular in shape (sometimes single much smaller intercalated denticles present on metafemora), those on the dorsal carinae rather low; medioventral carina very obtuse and marked by small, densely set granules. Protibiae wholly unarmed, meso- and metatibiae only with a few small ventral denticulations in the apical half. Basitarsus about as long as proceeding three joints taken together.

♂ (Fig. 64C-F)

Form and colouration. – Size and general form average for the genus (body length 53.8-59.5 mm), body armature well developed with the posterior meso- and metanotals prominent and multi-tuberculose to subspinose with a strong median spine (Fig. 64G); body surface sparsely granulated to tuberculated; dorsal surface with a fine medio-longitudinal carina. Colour with

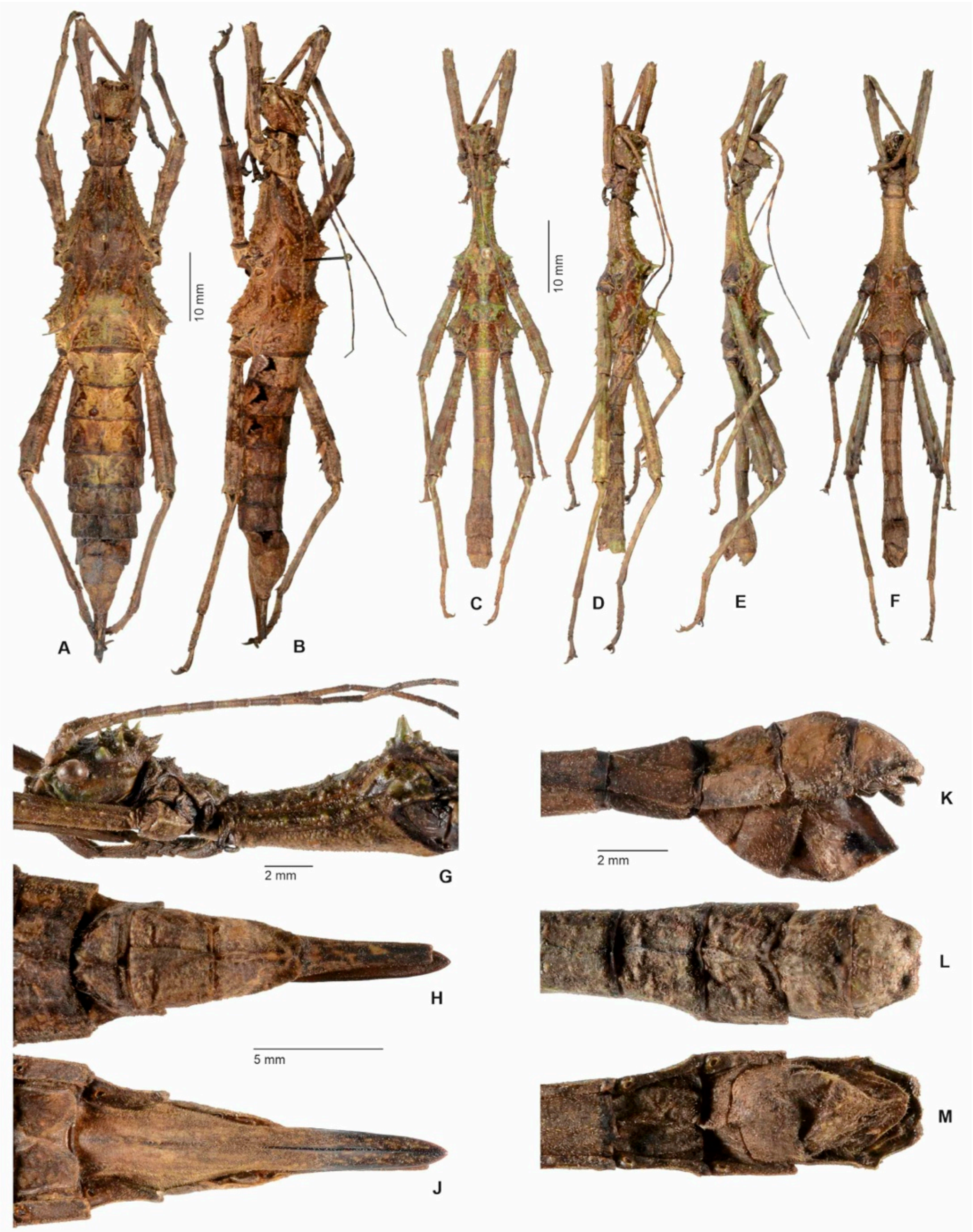

Fig. **64**. *Trachyaretaon mangyan* **n**. **sp**.

– **A**. ♀ paratype, dorsal view [FH 0119-3]. – **B**. ♀ paratype, dorsolateral view [FH 0119-3]. – **C**. ♂ paratype, dorsal view [FH 0119-12]. – **D**. ♂ paratype, dorsolateral view [FH 0119-12]. – **E**. ♂ paratype, lateral view [FH 0119-6]. – **F**. ♂ paratype, ventral view [FH 0119-12]. – **G**. ♂ paratype, head, pro- and mesothorax in lateral view [FH 0119-6]. – **H**. Terminalia of ♀ paratype in dorsal view [FH 0497-4]. – **J**. Terminalia of ♀ paratype in ventral view [FH 0497-4]. – **K**. Terminalia of ♂ in lateral view [FH 1351-11]. – **L**. Terminalia of ♂ in dorsal view [FH 1351-12]. – **M**. Terminalia of ♂ in ventral view [FH 1351-12].

more green tones than in ♀ and irregularly flecked with ochre, brown and some dark orange; the ventral body surface rather buff with some greenish speckles. The lateral markings of the abdominal terga seen in the ♀ are just weakly developed. One specimen has a broad, light cream-coloured medio-longitudinal dorsal streak on the metanotum and basal abdominal terga. Poculum with two roundish black markings posteriorly. Antennae essentially as in ♀ and becoming blackish towards the apex.

Head. – Shape and armature essentially as in ♀ but vertex somewhat more conical and all the spines notably larger and more spinose (Fig. 64G). Eyes relatively much larger, projecting hemispherically and their diameter contained only about 2x in length of genae. Antennae like in ♀ but reaching to abdominal segment IV.

Thorax. – Prothorax generally as in ♀ but armature comparatively much more pronounced; the posterior pronotals in particular strong and spinose (Fig. 64G). Mesothorax moderately elongate for the genus being 2.4-2.5x longer than the prothorax; anterior two-thirds slender and roughly parallel-sided, posterior portion strongly widened and inflated. Mesonotum unarmed except for a ± enlarged but very low pair of pre-median, median and post-median tubercles, the medio-longitudinal carina distinct but obtuse; posterior mesonotals prominent, strong, spinose and compound with several spiniform tubercles around the base. Metanotum with medio-longitudinal carina more pronounced than on mesonotum, the posterior metanotals generally like those of the mesonotum but even somewhat larger. Pleurae with armature essentially like in ♀ but more pronounced and the mesopleural very strong and spinose. Meso- and metasternum more densely granulose than in ♀ with the medio-longitudinal carina more distinct and obtuse; mesosternum with six indistinct, low and obtuse paired mesosternals; metasternum only with two tuberculiform metasternals.

Abdomen. – Median segment trapezoidal in outline with anterior margin rounded; the first paired posteriors somewhat enlarged and tuberculiform. Segment II trapezoidal, III-VI uniform in width, III-V almost equal in length and on average 1.3x longer than wide; VII notably shorter than all preceding segments and slightly widening towards posterior; V-VII with lateral margins weakly dentiform posteriorly. Terga II-VII unarmed except for latero-posterior pair of tubercles; the medio-longitudinal carinae becoming increasingly raised on V-IX and somewhat rounded and raised posteriorly on VI and VII. Sterna II-VI unarmed except for a small pair of anterior nodes on II-IV; VII acutely keeled longitudinally. Terga VIII and IX transverse with lateral margins moderately deflexed; IX with a faint posteromedian swelling (Fig. 64K). Anal segment trapezoidal in dorsal aspect being notably narrowed towards the posterior; the lateral margins with a small and obtuse dentiform process anteriorly (Fig. 64K); the posterior margin somewhat inflated with a shallow excavation medially and the outer angles obtusely rounded; dorsally with a fairly distinct rounded pit near each outer posterior angle (Fig. 64L). Epiproct small, shield-shaped and scarcely projecting into median excavation of posterior margin of anal segment. Vomer with base very broad, basically widely spearhead-shaped with a rather short terminal hook that is slightly arched towards the right. Cerci strongly compressed laterally, small. Poculum large, bulgy, obtusely cup-shaped (Fig. 64K) and with an acute medio-longitudinal keel in the vertical posterior portion; posterior margin rounded and moderately labiate (Fig. 64M).

Legs. – Basically, with armature like in ♀, but all teeth more acute and rather spiniform; hind legs projecting considerably over apex of abdomen. The basal two spines on the two exterior ventral carinae of the metafemora strong. Basitarsus slightly longer and slenderer, the pro- and metabasitarsus notably longer than following three joints taken together.

Variability. – Only slight variability is seen in the colouration and development of the entire armature of the body and limbs.

Nymphs. – As usual for members of Obriminae, nymphs have the body and leg armature much more strongly developed than adult insects, which is very well seen in the series of variously sized nymphs at hand.

Egg (Fig. 74N-O)

Moderately sized and fairly broad for the genus; capsule barrel-shaped, almost round in cross-section and almost 1.7x longer than wide. Surface generally smooth but minutely and unevenly pitted; the anterior one-fifth and operculum very sparsely covered with some very short setae. Micropylar plate very large and about 0.7x as long as capsule; median portion broad and the two posterolateral lobes very large, slightly broader than median portion of plate, strongly up-curved and on lateral surfaces of capsule almost reaching to anterior end of plate; surface pitted like capsule and outer margin flat. A deep and fairly indention posteromedially which has a slight narrowing before it widens into the gap, in which is a small and bowl-shaped micropylar cup. Median line short and indistinct Operculum almost round and weakly convex. General colour creamy greyish, the setose anterior portion of capsule and operculum brown; outer margin of micropylar plate blackish. Measurements [mm]: Length 4.7, width 2.5, height 2.8, length of micropylar plate 3.3.

Distribution. – Mindoro.

	♀, **HT** [RBINS]	♂, **PT**	♀, **PT**
Body	84.3	53.8-59.5	80.0-87.0
Pronotum	6.2	4.4-4.6	6.7-6.9
Mesonotum	14.0	10.3-11.8	12.3-13.9
Metanotum	7.4	5.7-6.3	7.3-8.2
Median segment	5.8	2.9-3.1	4.8-5.0
Profemora	16.7	11.6-13.8	15.0-15.4
Mesofemora	15.9	12.0-12.3	13.5-14.7
Metafemora	20.9	15.3-16.6	18.8-19.0
Protibiae	17.2	14.0-13.4	15.4-16.8
Mesotibiae	14.6	11.2-11.9	14.2-15.0
Metatibia	20.3	15.3-16.8	19.2-20.3
Antennae	46.9	41.0-45.0	45.0-48.0

Table 9. Measurements of *Trachyaretaon mangyan* **n. sp**.

Trachyaretaon nakatago **n. sp.**

(Fig. 65-66 & 74J-K)

ZooBank: https://zoobank.org/15ECC323-93BD-435E-BBF8-90C0FD9FF332

HT, ♀: Coll. R. I. Sc. N. B., Philippines, Luzon, Ilocos, leg. T. Heitzmann [RBINS].

PT, ♀, **1** egg: Philippinen, E-Luzon, Provinz Aurora, Dingalan Munip., 12.2012, local collector [FH, No's 1468-1 & E].

PT, ♀, **1** egg: Philippines, NW-Luzon, Provinz Ilocos Norte, Adams Munip., VII.2012, local collector [FH, No's 1468-2 & E].

PT, **1** ♀, **1** ♂: Philippinen, E-Luzon, Sierra Madre, Provinz Aurora, Daminagat, San Luis Munip., VI.2013, local collector [FH, No's 1468-3 & 4].

Differentiation. – Females of this large new species are very similar to *T. bresseeli* **n. sp.** and *T. carmelae* and morphologically represent kind of an intermediate between these two species. From *bresseeli* they merely differ by the notably larger size and somewhat less stocky shape, smaller ventral teeth of the femora, more prominent mesosternals and much more distinct medio-longitudinal carina of the meso- and metasternum (Fig. 65H), which is densely covered by small glossy granules. From *carmelae* they can be separated by being averagely smaller and slightly stockier, having the cephalic and thoracic armature notably more pronounced (Fig. 65G), the dentations of the limbs less numerous and larger, the mesosternals larger, the medio-longitudinal carina of the meso- and metasternum more distinct and more densely granular (Fig. 65H) and the posterior margin of the anal segment not notably inflated laterally. Males come morphologically closest to those of *bresseeli* but may be separated by the much more distinct medio-longitudinal carina of the meso- and metasternum (Fig. 66E), smaller ventral teeth of the meso- and metafemora but more incrassate and dorsally rounded and raised subapical portion of the metafemora as well as the rounded and entire posterior margin of the poculum (Fig. 66H). The eggs (Fig. 74J-K) are very similar to those of *bresseeli* and only differ by the less narrowed polar half of the capsule and slightly more downward directed posterolateral expansions of the micropylar plate. From those of *carmelae* the eggs of this new species can be differentiated by the somewhat smaller dimensions and less elongated shape (1.6x *vs.* 1.8x longer than high) and slightly shorter micropylar plate, which has the posterolateral expansion comparatively larger and broader.

Etymology. – The name (*nakatago* Filipino = hidden) refers to the strong morphological similarity and intermediate position of this large new species between the Luzonese *T. bresseeli* **n. sp.** and *T. carmelae* (Lit & Eusebio, 2005), which also occurs on the island of Luzon. Neuter.

Description

The colouration is described from dried specimens only.

♀ (Fig. 65)

Form and colouration. – Large (body length 98.0-106.0 mm), shape fairly typical for the genus with moderately developed body armature and fairly low, but conical and multi-tuberculated posterior meso- and metanotals; body surface sparsely and unevenly granular and tuberculate and with a fine medio-longitudinal dorsal carina. General colour fuscous or drab (specimen from San Luis) and a mixture of various tones of mid to dark brown, occasionally with some ochre to buff markings and portions particularly on abdominal terga; lateral surfaces of terga II-VII usually with an elongate arch-shaped black marking and sometimes a triangular black anterior lateral marking on tergum VIII. The paratype from Adams, Ilocos Norte (Fig. 65B-E) has a weakly indicated pale triangular anterior marking on the mesonotum and shows a hint of olive wash on the head, thoracic nota and basal portions of the femora. Granules of the medio-longitudinal keel of the meso- and metasternum glossy and contrasting russet in colour. Frons with two very faint roughly triangular dark brown markings. Eyes drab, antennae dark brown with some faint lighter annuli.

Head. – Scarcely longer than wide with vertex fairly inflated, conically rounded and slightly projecting over anterior margin of pronotum (Fig. 65G). Supra-antennals distinct and acutely pointed; supra-orbitals similar in size and shape; genae only with 1-3 rather irregularly placed, small and rather node-like gulars. The median coronals rather small and conical, the lateral coronals notably larger, strong and conical with a broad base; two rather strong but short supra-orbitals present that are roughly equal in size to the median coronals; anterior portion of vertex with several variably sized tubercular to spiniform occipital medial tubercles. Eyes moderately projecting with anterior margin distinctly triangular and diameter of eye corresponding to 0.5x the length of gena. Antennae with 27 joints and reaching to abdominal segment IV; the median antennomeres strongly elongated. Scapus rectangular in dorsal aspect and longer than wide; pedicellus shorter, round in cross-section and somewhat constricting towards apex; III noticeably longer than pedicellus.

Thorax. – Pronotum scarcely longer and about as wide as head, with the lateral margins concave; the transverse median sulcus shallow, short, straight and short; surface sparsely and unevenly nodulose (Fig. 65G). The strong pair of posterior pronotals represent the largest of the pronotal spines; anterior portion only with a low and conical pair of posterior mesal pronotals, the antero-lateral pronotals small, the inter-posterior pronotals only represented by small tubercles. Mesothorax gradually ascendant and widened towards the posterior, shape strongly trapezoidal with posterior margin 2.7x wider than anterior margin (Fig. 65A); 2.3x longer than prothorax. Mesonotum just slightly trapezoidal in outline and only with a short pair of pre-median mesonotal tubercles; the median portion with a variable number of irregularly placed paired tubercles (two pairs of notably enlarged tubercles in holotype); compound posterior mesonotals rather low, conical and multi-tuberculated with the median tubercle somewhat enlarged, strong and conical; a small but conical pair of inter-posterior mesonotals present (Fig. 65G). Lateral margins unevenly tuberculated with the largest tubercles slightly spiniform. Mesopleurae increasingly widening towards posterior and with a fairly strong and conical mesopleural; otherwise minutely tubercular and with four notably enlarged, obtuse spines; no antero-lateral. Metanotum subquadrate with anterior portion narrowed, the posterior metanotals like those of the mesonotum but slightly lower; the inter-posteriors as on mesonotum and in front with a slightly enlarged pair of median metanotal tubercles. Metapleurae strongly expanded posteriorly; metapleural small but composite, the lateral margin unevenly tuberculated and with four conical and almost equally sized laterals as well as three unevenly sized supra-coxals. Sensory areas of prosternum large and semi-circular in outline. Meso- and metasternum (Fig. 65H) densely granular and with a distinct, acute medio-longitudinal keel, which is densely set with glossy granules; mesosternum with three strong and conical mesosternals on each side; metasternum only with one tubercle laterally.

Abdomen. – Median segment roundly trapezoidal in shape with anterior margin widely rounded; the four posteriors only represented by small nodes, surface otherwise only with a small paired of median nodes. Segments II-VII roughly uniform in width, II-IV slightly increasing and V-VII decreasing in length; all transverse with IV about 1.8x wider than long. Lateral margins of terga IV-VII weakly deflexed and obtusely angular posteriorly; surface of II-VII with the medio-longitudinal carina very distinct and only with five small posterior tubercles (the median tubercle increasingly pronounced from II to VII) and an indistinct pair of latero-anterior tubercles; surface otherwise smooth. Sterna smooth except for an anterior and posterior pair of granules and an irregularly, obtuse lateral carina (Fig. 65E). Praeopercular organ formed by a moderately broad, angularly semi-circular median excavation of posterior margin of sternum VII, which otherwise is slightly inflated and forms a small swelling medially and at each outer angle (Fig. 65F). Terga VIII and IX each with a small, obtuse posteromedian swelling that formed by an excrescence of the medio-longitudinal carina (Fig. 65D); IX and X much narrower than all preceding segments. Anal segment progressively narrowing; the anterior two-thirds strongly descendant and with a distinct and obtuse medio-longitudinal bulge; the posterior margin somewhat inflated and bi-dentate with a fairly narrow triangular median indention. Epiproct straight in lateral aspect, about 1.2-1.4x longer than anal segment, weakly and obtusely tectate longitudinally and slightly gradually narrowing towards a shallowly notched apex. Subgenital plate long, lanceolate and distinctly keeled in the apical half; the apex narrowed, pointed and slightly surpassing tip of epiproct (Fig. 65F).

Legs. – Moderately long and slender for the genus with the dentations moderately developed, the meso- and metafemora notably incrassated. Basal flexure and constriction of profemora weakly developed; the two exterior

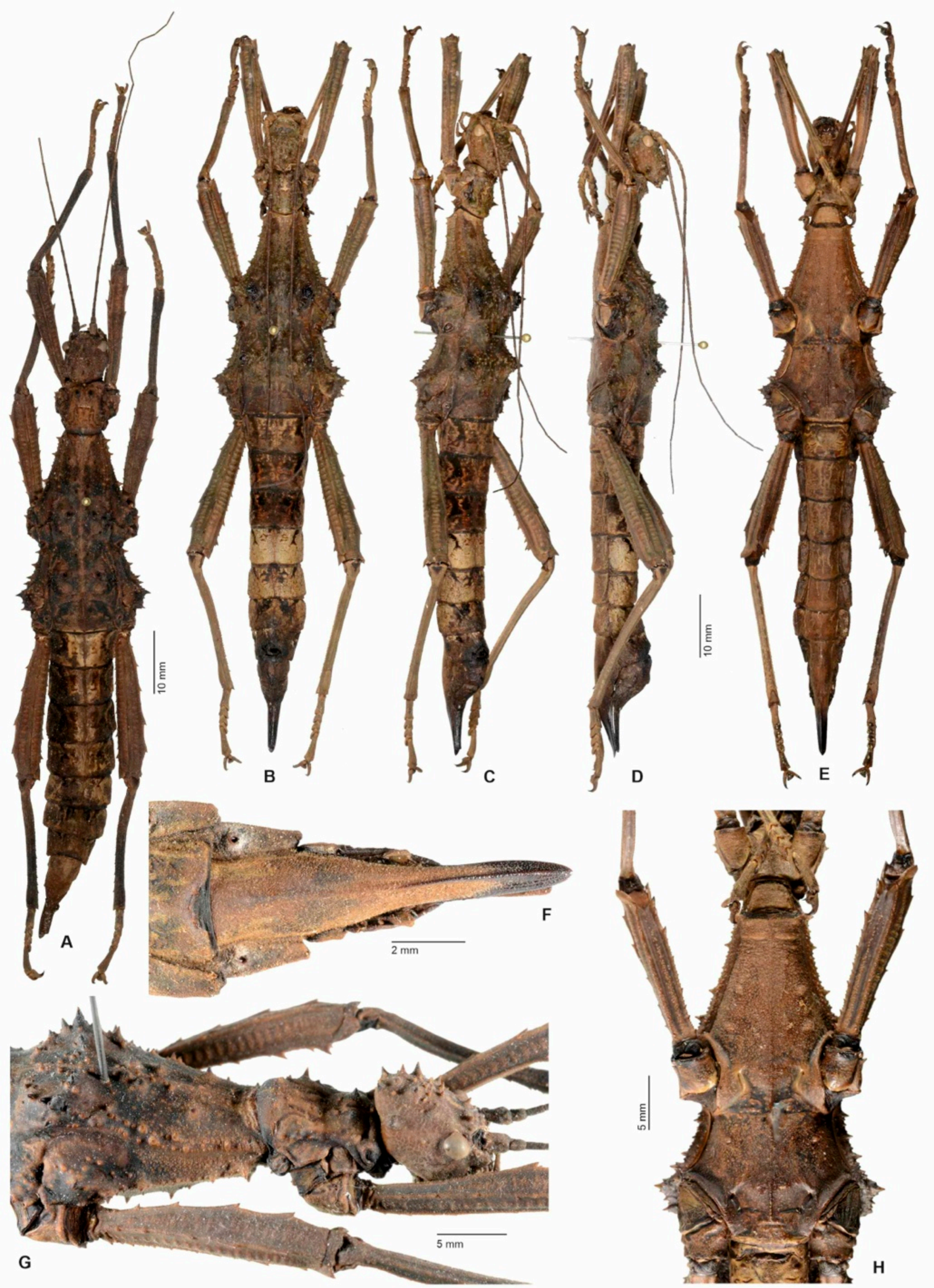

Fig. 65. *Trachyaretaon nakatago* **n. sp.** ♀.

– **A**. Holotype, dorsal view [RBINS]. – **B**. Paratype, dorsal view [FH 1468-2]. – **C**. Paratype, dorsolateral view [FH 1468-2]. – **D**. Paratype, lateral view [FH 1468-2]. – **E**. Paratype, ventral view [FH 1468-2]. – **F**. Terminalia of holotype in ventral view [RBINS]. – **G**. Head and thorax of holotype in dorsolateral view [RBINS]. – **H**. Meso- and metasternum of paratype [FH 1468-2].

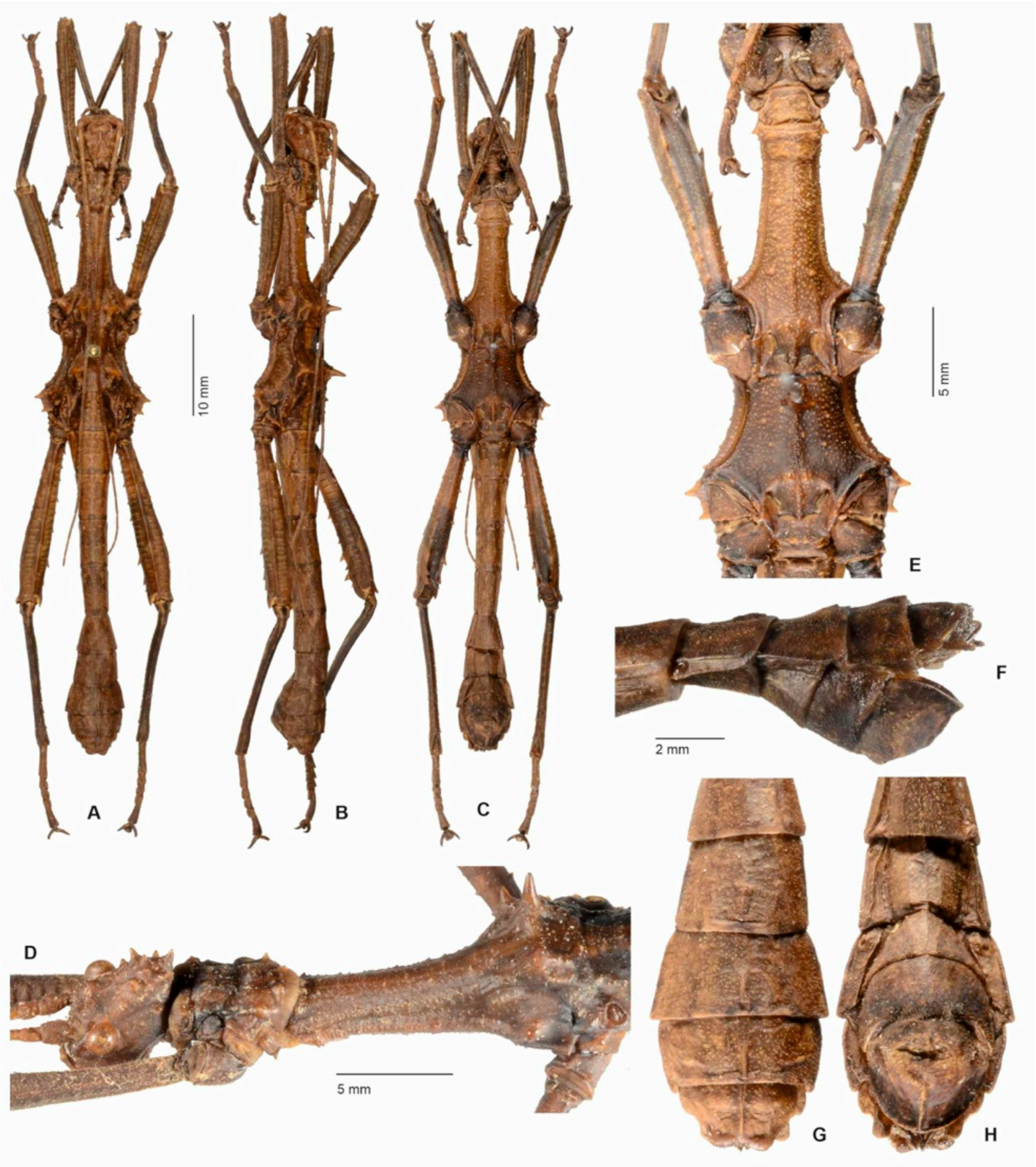

Fig. 66. *Trachyaretaon nakatago* **n. sp.** ♂ paratype [FH 1468-4].

– **A**. Habitus, dorsal view. – **B**. Habitus, dorsolateral view. – **C**. Habitus, ventral view. – **D**. Head and thorax in dorsolateral view. – **E**. Meso- and metasternum. – **F**. Terminalia in lateral view. – **G**. Terminalia in dorsal view. – **H**. Terminalia in ventral view.

ventral carinae with two distinct and acute triangular teeth in apical one-third; dorsal carinae each with five low teeth that increase in size towards the base. All four carinae of meso- and metafemora with five teeth that become notably larger towards the apex of femur; those on the ventral carinae acutely triangular in shape (sometimes single much smaller intercalated denticles present), those on the dorsal carinae rather low but broader; medioventral carina very shallow and marked by minutely, densely set granules (Fig. 65H). Pro- and mesotibiae wholly unarmed, metatibiae only with a few small ventral denticulations in the apical half. Basitarsus a little longer than proceeding two joints taken together.

♂ (Fig. 66)

Form and colouration. – Size fairly large (body length 61.5 mm), general form average for the genus, body armature moderately developed with the posterior meso- and metanotals prominent, spinose and rather minutely multi-tuberculose around the base; body surface sparsely granular to tuberculate; dorsal surface with an obscure medio-longitudinal carina. Colour of the unique specimen at hand a mixture of various tones of ochre and buff as well as mid brown on the meso and meatathorax, with the lateral portions of the metanotum and median segment mostly mid brown. Posterior meso- and metanotals as well as meso- and metapleurals ochre with a slight orangey hue. Ventral body surface rather uniformly buff with the metasternum, abdominal steran I-II and poculum mid to greyiosh dark brown. Limbs buff to drab with some irregular darker mottling; the tibiae wholly dark brown and the ventral surface of femora dark greyish brown in the apical half. Antennae pale ochre basally and becoming slightly darker towards the apex.

Head. – Shape and armature essentially as in ♀ but vertex somewhat less conical and all the spines slenderer and more spinose (Fig. 66D). Eyes relatively larger, projecting hemispherically and the diameter of eye corresponding to about 0.6x length of gena. Antennae like in ♀ but reaching to posterior margin of abdominal segment IV.

Thorax. – Prothorax generally as in ♀ but slightly narrowing posteriorly, the lateral margins less concave and all elements of armature comparatively less pronounced; the posterior and anterior pronotals conical (Fig. 66D). Mesothorax fairly elongate for the genus and 2.8x longer than the prothorax; anterior two-thirds slender and roughly uniform in diameter except for a slight widening at anterior margin, posterior portion strongly widened and inflated (Fig. 66D). Mesonotum densely granular and somewhat tubercular along lateral margins with a shallow and obtuse medio-longitudinal bulge but otherwise unarmed; only posterior mesonotals prominent, strong, spinose and with a few small obtuse tubercles and granules around the base (Fig. 66D). Metanotum with medio-longitudinal bulge somewhat more pronounced than on mesonotum; the median pair of tubercles small, the posteriors like those of the mesonotum but slightly larger. Pleurae with armature essentially like in ♀ but much less pronounced; the antero-lateral short but spinose and the meso- and metapleural larger, conical and more spinose in shape than in ♀. Meso- and metasternum (Fig. 66E) more densely granulose than in ♀ with the medio-longitudinal carina slightly more distinct and granular; mesosternum with eight indistinct, low and obtuse paired mesosternals; metasternum only with two small tuberculiform metasternals laterally.

Abdomen. – Median segment distinctly trapezoidal in outline and with an obtuse medio-longitudinal bulge; only the second paired posteriors developed and represented as low tubercules. Segments II, VI and VII trapezoidal, III-V uniform in width, II-V slightly increasing and VI-IX decreasing in length; V longest segment and about 1.6x longer than wide. Terga II-VII with the medio-longitudinal carina fine and very obscure in IV and V, otherwise without any noteworthy armature. Sterna II-VII minutely granular and all with a distinct medio-longitudinal carina. Terga VI-VIII gradually widening with VIII widest of all abdominal terga; VIII-IX each with the medio-longitudinal carina pre-posteriorly raised and protruded into a shallow dentiform swelling (Fig. 66F). VIII and IX transverse with lateral margins moderately deflexed and gently widened and in IX with the posterolateral angles somewhat protruded. Anal segment basically trapezoidal in dorsal aspect and strongly narrowing towards the posterior (Fig. 66G); the lateral margins deflexed and forming an obtuse dentiform process anteriorly (Fig. 66G-H); the posterior margin narrow, somewhat inflated and bi-lobate with a distinct roundly triangular median indention; dorsal surface with a fine medio-longitudinal carina. Epiproct small, shield-shaped and almost fully concealed under anal segment; the paraprocts large with the apex dentiform and slightly projecting over posterior margin of anal segment (Fig. 66G-H). Vomer rather small and basically heart-shaped with base broad and the terminal point short, conical and distinctly arched towards the right. Cerci conical and compressed laterally. Poculum large, bulgy, obtusely cup-shaped (Fig. 66F) and with an acute medio-longitudinal keel in the vertical posterior portion; posterior margin very broad and roundly angular (Fig. 66H).

Legs. – Basically, with armature like in ♀, but all teeth somewhat smaller in comparison and more acutely pointed and spiniform on the ventral carinae of the meso- and metafemora; those on the dorsal carinae however noticeably less pronounced and almost wanting; hind legs projecting considerably beyond apex of abdomen. The basal two teeth on the two exterior ventral carinae of the metafemora represented as strong spines. Metafemora notably incrassate in the apical half with the dorsal portion characteristically raised and rounded (fig. 66B). Basitarsus slightly longer and slenderer than in ♀, the pro- and metabasitarsus notably longer than following three joints taken together.

Variability. – Only slight variability is seen in the colouration and development of the entire armature of the body and limbs in ♀. The holotype (Fig. 65A) has all elements of the cephalic and thoracic armature somewhat more developed than the other two species, of which the example from Dingalan has the least developed tubercles and spines and is of a somewhat lighter general colour. Moreover, this specimen lacks the black lateral marking of the abdominal terga seen in the other two examples. The ♀ from San Luis is lighter in colour than all other examples and fairly plain ochraceous.

Egg (Fig. 74J-K)

Rather large for the genus; capsule slightly bullet-shaped with the posterior half weakly narrowing, slightly oval in cross-section; 2x longer than wide. Surface densely pitted; the operculum covered with short setae. Micropylar plate fairly small and about 0.6x the length capsule; basically Y-shaped with the median portion slightly gradually narrowing towards the anterior end and the two posterolateral extensions rather small, oval and extending on lateral surfaces of capsule at an angle of about 85°; surface pitted like capsule and the outer margin notably inflated. Posterior portion widely V-shaped with a tiny bowl-shaped micropylar cup in centre. Median line distinct and formed by an obtuse, irregularly shaped bulge that reaches to the polar area and there terminates in a conical swelling. Operculum almost round and weakly convex; inserted into capsule roughly at a right angle. General colour plain greyish mid brown, the setae of the operculum sepia brown; outer margin of micropylar plate dark grey. Measurements [mm]: Length 4.8, width 2.4, height 2.5, length of micropylar plate 2.8.

Distribution. – North & Northeast Luzon.

	♀, **HT** [RBINS]	♀, **PT** Adams [FH]	♀, **PT** Dingalan [FH]	♀, **PT** San Luis [FH]	♂, **PT** San Luis [FH]
Body	98.5	101.0	106.0	98.0	61.5
Pronotum	7.0	7.0	7.2	6.0	4.8
Mesonotum	15.8	16.0	17.2	15.3	12.2
Metanotum	9.7	10.1	10.3	8.8	5.6
Median segment	4.9	5.0	5.2	5.0	3.8
Profemora	19.0	18.8	19.8	17.6	13.8
Mesofemora	17.7	16.9	18.0	15.4	11.4
Metafemora	22.0	21.8	25.4	21.6	15.7
Protibiae	17.3	20.0	21.6	19.7	13.3
Mesotibiae	16.8	17.1	18.9	15.0	12.1
Metatibia	21.7	24.0	26.0	22.0	15.2
Antennae	54.0	59.0	62.0	> 44.0	44.0

Table 10. Measurements of *Trachyaretaon nakatago* **n. sp.**

Trachyaretaon negrosanon n. sp.

(Fig. 67-68, 72L & 74L-M)

ZooBank: https://zoobank.org/D6020213-FB38-4827-8FD4-02EDFD5D7270

HT, ♀: Philippines, Negros Occidental, Mt. Kanlaon, V.2008, leg. Arimas [RBINS].

PT, **8** ♀, **9** ♂: Philippines, Negros Occidental, Mt. Kanlaon, V.2008, leg. Arimas. Ex Culture Bresseel, 2010 [RBINS].

PT, **20** ♀, **29** ♂, **50** eggs: Philippinen, Philippinen, N-Negros Island, Mt. Kanlaon & Mt. Mandalangan, leg. J. Arimas V.2006; Ex Zucht: F. Hennemann 2011-12, Herkunft: Philippinen, N-Negros Island, leg. J. Arimas V.2008 [FH, No's 0716-1 to 49, E].

Differentiation. – This pretty and very distinctive new species is morphologically nearest and apparently most closely related to *T. tumandok* **n. sp**. from the island of Panay, with which ♀ share the basically greener overall colouration if compared to other congenerics, and with which ♂ have the characteristic black abdominal sterna II-VII in common (Fig. 67G). The mossy colour pattern of ♀ is also shared with *T. maliit* **n. sp**. from Luzon, but this species differs considerably in numerous morphological aspects. A close relation of *negrosanon* and *tumandok* is moreover supported by the distribution on the central Visayan islands of Negros and Panay, which are the two main islands of the central Philippine biogeographic region termed Greater Negros-Panay. This new species however is notably smaller than *tumandok*, has the cephalic and thoracic armature comparatively more developed and the head has the vertex more prominently inflated and tumescent (Fig. 67H). Females are slenderer in overall shape than those of *tumandok* and may also be separated by the entire and not medially notched posterior margin of the anal segment (Fig. 67N) and longer subgenital plate, which projects notably beyond the tip of the epiproct (Fig. 67M-O). Males have the pair of black markings on the abdominal terga II-V more prominent, the mesothorax is relatively shorter and only 2.25x longer than the prothorax (2.6x in *tumandok*), the antennae are comparatively longer and reach to abdominal segment VII (IV in *tumandok*) and the anal segment is much more narrowed towards the posterior and lacks the two posterolateral impressions seen in *tumandok* (Fig. 67K). The eggs (Fig. 74L-M) resemble those of *T. mangyan* **n. sp.** and *T. tumandok* **n. sp.** in having the posterolateral extensions of the micopylar plate expanded into a large oval and up-curved lobe, but they may be separated from the eggs of both species by the slightly smaller dimensions, notably smaller median portion of the micropylar plate in relation to the lateral extensions as well as the very densely setose anterior portion of the capsule and operculum.

Etymology. – Named after the indigenous Negrosanon people (Cebuano for Negrense), who are native to the Philippine provinces of Negros Occidental, Negros Oriental and Siquijor.

Description

The colouration is described from numerous colour photographs live captive reared specimens (Fig 68).

♀ (Fig. 67A-D)

Form and colouration. – Size average (body length 72.0-80.5 mm) form rather slender for the genus with strongly developed body armature with distinct conical, multi-tuberculated posterior meso- and metanotals; body surface unevenly tuberculate and with a fine but defined medio-longitudinal carina dorsally. Colour various tones of light to dark green or olive and irregularly flecked with brown or black; general appearance mossy to lichenose. Ventral surface mostly plain light greenish cream to fawn. Abdominal tergum IV often with a variably shaped and sized bright green medio-anterior marking (Fig. 67A, C & 68A). Pronotum with a dark brown medio-longitudinal streak on pronotum, mesonotum with a more or less defined cream-coloured triangular median marking at anterior margin and abdominal terga III and IV with an inversely V-shaped blackish marking on lateral surfaces. All femora with a broad brown and a somewhat narrower green median transverse band. Frons with two weakly defined brown triangular markings; eyes dark yellow flecked with brown. Antennae blackish brown with some narrow yellowish annulae.

Head. – Slightly longer than wide with vertex strongly inflated, roundly conical and slightly projecting over anterior margin of pronotum (Fig. 67H); practically all cephalic spines present that are typical for Obriminae. Supra-antennals very prominent, spiniform and connected by a transverse bulge; supra-orbitals small, the supra-orbital series consisting of about 4-5 small rather node-like tubercles and 3-4 small gulars present. Occipital medials rather irregularly dispersed and somewhat unequal in size with the posterior pair largest. Median coronals prominent and represented by fairly strong, conical spines; the lateral coronals much smaller and blunt. Eyes circular in outline, moderately projecting and their diameter contained about 2x in length of genae. Antennae with about 27 joints and reaching to posterior margin of abdominal segment IV; the median antennomeres in particular strongly elongated.

Thorax. – Pronotum scarcely longer than wide, shorter and somewhat narrower than head with the lateral margins notably concave; the transverse median sulcus fairly shallow, weakly curved but expanding over entire width of segment. Anteriors only represented by small tubercles with the antero-laterals slightly more pronounced; posterior mesal pronotals represented by moderately distinct conical spines; posterior half with four small medial pronotals thar roughly form a quadrate; inter-posterior pronotals only represented by rather low conical tubercles and the posterior pronotals much more pronounced and spiniform but blunt-tipped (Fig. 67H). Mesothorax strongly gradually ascendant and widened towards the posterior, shape strongly trapezoidal with posterior margin almost 2.5x wider than anterior margin; 2.2x longer than prothorax. Mesonotum also trapezoidal and unevenly tuberculated, central portion with six rather low but strong and conical median mesonotals; the posterior mesonotals prominent, compound, conical in shape and multi-tuberculated to multi-spinose with a just moderately enlarged and short, conical median spine (Fig. 67H). Mesopleurae increasingly deflexed towards posterior and with a fairly strong and conical multi-tuberculated mesopleural; the antero-lateral, medio-lateral and one of the supra-coxals somewhat enlarged and bluntly spiniform; surface otherwise densely and unevenly tuberculated. Metanotum trapezoidal in outline, general surface as tuberculated as mesonotum and posterior metanotals basically like the corresponding posteriors of the mesonotum. Metapleural small, the lateral margin unevenly tuberculated and with a strong median supra-coxal; a much smaller supra-coxal present in front and near posterior margin. Meso- and metasternum with an obtuse and granulose medio-longitudinal keel and each with a small closely spaced pair of small spiniform tubercles subposteriorly; general surface sparsely granulose to nodulose (the mesosternum more so); mesosternum with six paired rather low but very prominent, conical mesosternals; metasternum only with about six small node-like tubercles.

Abdomen. – Median segment trapezoidal with posteriors only represented by small tubercles. Segments II-V slightly sub-uniform in width VI-X narrowing; II-VI slightly increasing in length, V as long as IV, proceeding segments decreasing in length; IV and V about 2x wider than long. Lateral margins of terga III-VII somewhat deflexed and rounded posteriorly, the deflexion weak on II but gradually more pronounced towards VII; surface with median carina represented by two faint, subparallel and closely spaced carinae and with a few small scattered tubercles; the five posteriors represented only as small spinose tubercles; in front with a somewhat more pronounced but blunt pair of lateral anteriors. The posterior mesal on V-IX enlarged to form a laterally compressed lobe that is rounded and rather low on V-VII and obtusely dentiform on VIII and IX (Fig. 67M); the lateral margins of VIII and IX not notably deflexed and very weakly rounded. Sterna II-V fairly smooth and only with a widely spaced anterior and posterior pair of small tubercles. Sternum VII with posterior margin somewhat inflated, deflexed and bi-lobes with a shallow, concave median excavation; a small pit within the excavation (praeopercular organ, Fig. 67O). Anal segment distinctly tectate medio-longitudinally, strongly declining towards the apex and essentially triangular in dorsal aspect with the lateral margins gently deflexed anteriorly; the posterior rounded portion rounded with the margin almost wholly entire and weakly labiate (Fig. 67N). Epiproct straight in lateral aspect, about 1.8x longer than anal segment, weakly tectate longitudinally and slightly gradually narrowing towards an obtusely rounded to weakly notched apex (Fig. 67N). Subgenital plate long, lanceolate and distinctly keeled in the apical half (Fig. 67O); base with an obtuse medial protuberance; the apex narrowing, pointed and surpassing tip of epiproct (Fig. 67M-N).

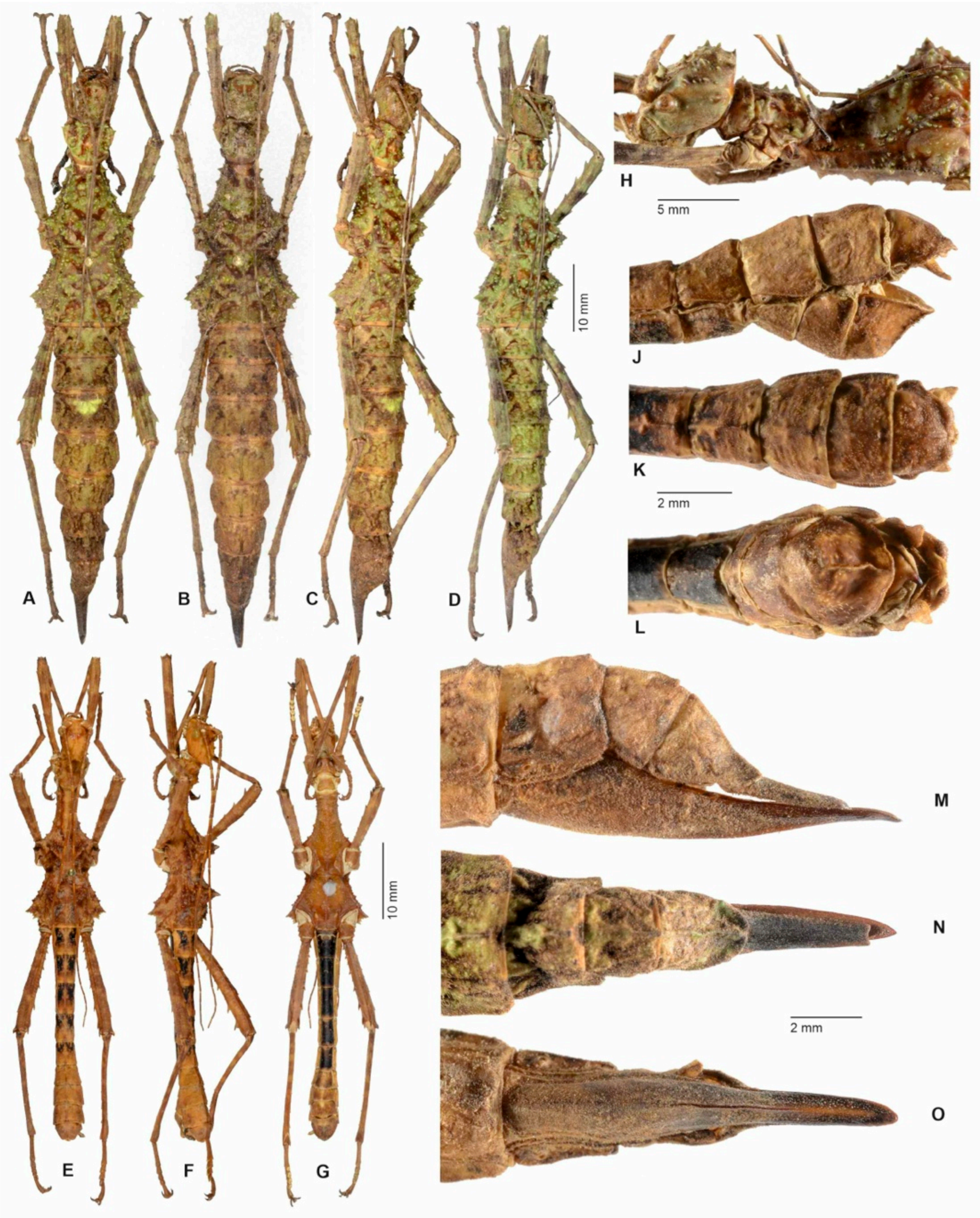

Fig. 67. *Trachyaretaon negrosanon* **n. sp**.

– **A**. ♀ paratype, dorsal view [FH 0716-7]. – **B**. ♀ paratype, dorsal view [FH 0716-8]. – **C**. ♀ paratype, dorsolateral view [FH 0716-7]. – **D**. ♀ paratype, dorsolateral view [FH 0716-3]. – **E**. ♂ paratype, dorsal view [FH 0716-8]. – **F**. ♂ paratype, dorsolateral view [FH 0716-3]. – **G**. ♂ paratype, ventral view [FH 0716-3]. – **H**. Head, pro- and mesothorax of ♀ paratype in lateral view [FH 0716-22]. – **J**. Terminalia of ♂ paratype in lateral view [FH]. – **K**. Terminalia of ♂ paratype in dorsal view [FH]. – **L**. Terminalia of ♂ paratype in ventral view [FH]. – **M**. Terminalia of ♀ paratype in lateral view [FH]. – **N**. Terminalia of ♀ paratype in dorsal view [FH]. – **O**. Terminalia of ♀ paratype in ventral view [FH].

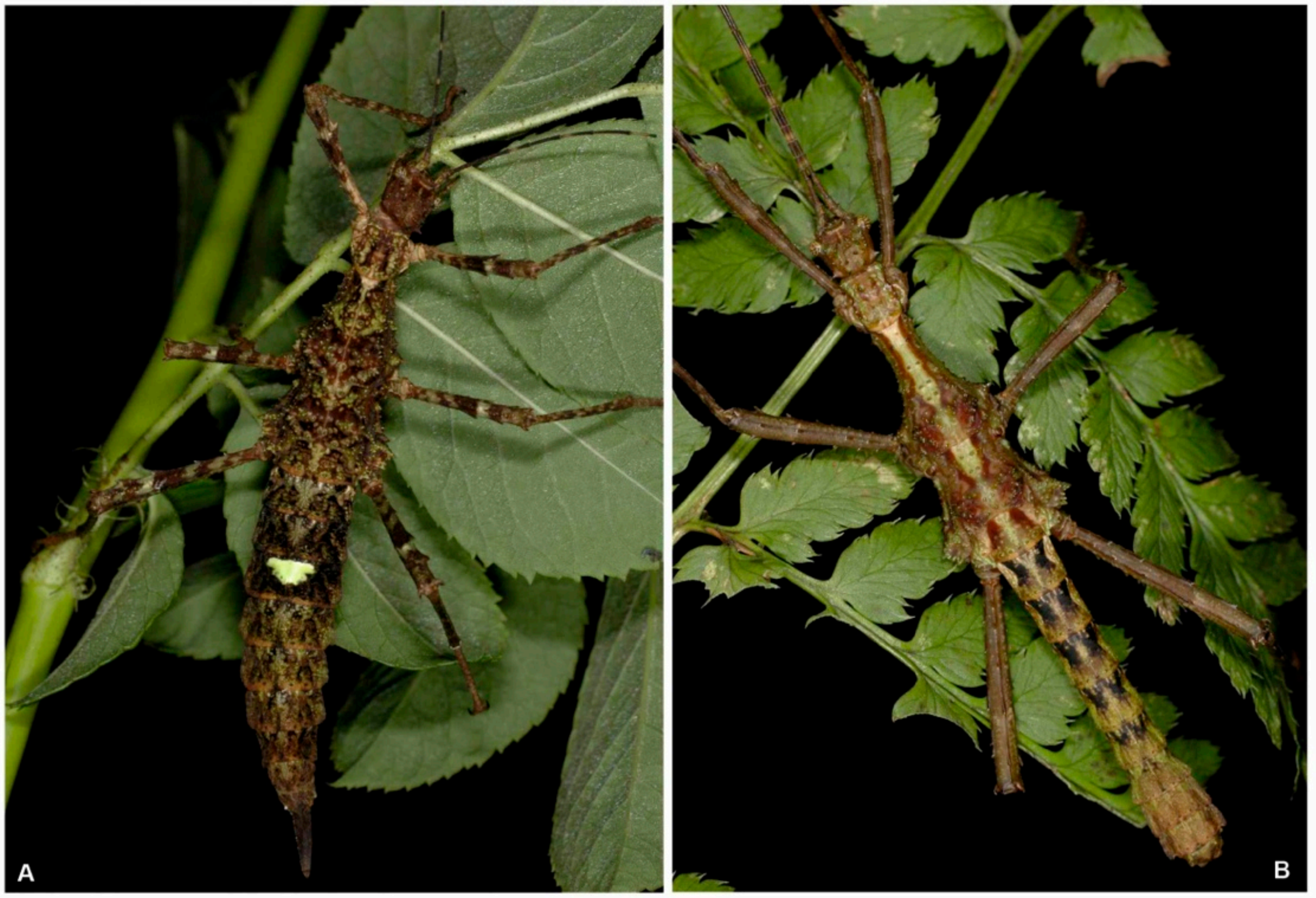

Fig. 68. *Trachyaretaon negrosanon* **n. sp**. Live insects (captive reared). – **A**. ♀. – **B**. ♂.

Legs. – Moderately long and of average shape for the genus with the armature fairly distinct but pro- and mesotibiae wholly unarmed. Basal flexure and constriction of profemora weakly developed; the anteroventral carina with three distinct triangular teeth in apical one-third; posteroventral carinae only with three small denticles; dorsal carinae each with five wide teeth that slightly increase in size towards the apex. All four carinae of meso- and metafemora with five low and wide teeth that become notably larger towards the apex of femur; those on the ventral carinae more spiniform and often there are a few much smaller intercalated teeth; medioventral carina only indicated by an irregular row of granules. Central carinae of metatibiae with a few rather small dentations in the apical two-thirds. Basitarsus slender and somewhat longer than proceeding three joints taken together.

♂ (Fig. 67E-G)

Form and colouration. – Small and general form average for the genus (body length 45.5-55.0 mm), body armature rather moderately developed with the posterior meso- and metanotals conical and multi-tuberculated to subspinose; body surface except for abdomen granulated to minutely tuberculate; dorsally with a weakly indicated medio-longitudinal carina which is most visible on abdominal terga. Colour essentially dark green to olive or rather brownish, the head and legs rather greenish brown. Meso- and metanotum with a broad pastel green medio-longitudinal streak that is laterally bordered by a narrower brown line, the lateral surfaces and pleurae greenish with more brownish tones posteriorly, the posterior meso- and metanotals reddish brown (Fig. 68B). Abdominal terga II-VI in particular with a pair of variably shaped and defined black median markings (notably decreasing in size on V and VI, Fig. 67E-F & 68B)) and the lateral surfaces with an almost semi-circular pastel green marking. Ventral surface of thorax fawn to ochre, abdominal sterna II-VII black (Fig. 67G). All femora with a weakly indicated light post-median transverse band. Eyes and antennae coloured like in ♀.

Head. – Shape and armature essentially as in ♀ but the vertex somewhat more conical in shape and all spines slightly more spinose; gulars wanting. Eyes relatively much larger, projecting more than hemispherically and their diameter contained less than 1.5x in length of genae. Antennae like in ♀ but reaching to abdominal segment VII.

Thorax. – Prothorax generally as in ♀ but armature comparatively less developed. Mesothorax rather short for the genus and only 2.25x longer than the prothorax; anterior two-thirds slender and roughly parallel-sided, posterior portion strongly widened and inflated. Mesonotum unarmed except for the six paired low median tubercles also seen in the ♀; compound posterior mesonotals more prominent than in ♀ with the central spine in particular notably longer and pointed. Metanotum with the posteroior metanotals generally like the posteriors of the mesonotum and similar in size. Pleurae with armature essentially like in ♀, but the antero-lateral of mesopleurae more prominent and spiniform. Meso- and metasternum (Fig. 67G) weakly tectate medio-longitudinally and the flat medio-longitudinal keel set with glossy granules; armature as in ♀ but with all tubercles less developed.

Abdomen. – Median segment distinctly trapezoidal in outline and scarcely wider than long. Segment II trapezoidal, III-V almost uniform in width and length, rectangular; VI-VII gradually widening and decreasing in length; III and IV about 1.4x longer than wide; VII shorter than all preceding. Terga II-VII unarmed except for a somewhat enlarged pair of latero-anterior nodes; VI-IX with the medio-longitudinal carina increasingly distinct and more so towards the posterior margin of each tergum, where it is rather keel-shaped and forms a flat, obtusely triangular protrusion at least on VI-IX. Sterna II-VII smooth but II-V with a small anterior and posterior pair of granules. Terga XIII and IX distinctly transverse with lateral margins fairly straight. Anal segment shorter and notably narrower than all preceding terga, strongly narrowing towards the posterior (Fig. 67K), the lateral margins somewhat deflexed and angular anteriorly (Fig. 67J); the posterior margin somewhat inflated, with a deep triangular excavation medially and bi-lobate; dorsally surface with a weak and obtuse medio-longitudinal bulge. Epiproct rather large, semi-circular and projecting notably beyond posterior margin of anal segment (Fig. 67K). Vomer rather small, basic shape roundly triangular, the terminal hook

	♀, **HT** [RBINS]	♂, **PT**	♀, **PT**
Body	74.2	45.5-55.0	72.0-80.5
Pronotum	5.5	3.2-3.5	4.6-5.0
Mesonotum	10.9	8.3-11.2	10.8-12.0
Metanotum	6.4	4.4-4.8	5.8-6.4
Median segment	3.7	2.4-2.6	2.8-3.1
Profemora	13.7	10.8-11.5	12.4-14.5
Mesofemora	13.3	10.0-10.4	12.2-13.3
Metafemora	18.5	13.9-15.0	15.2-16-7
Protibiae	15.6	11.9-12.3	14.8-16.2
Mesotibiae	14.2	11.2-12.0	13.9-14.9
Metatibia	18.7	14.8-16.6	17.8-20.0
Antennae	-	36.0-40.0	44.0-50.0

Table 11. Measurements of *Trachyaretaon negrosanon* **n. sp.**

of moderate length, straight and dextral directed by about 45° (Fig. 72L). Cerci relatively large, strongly compressed laterally and obtusely triangular in lateral aspect. Poculum large, bulgy, obtusely cup-shaped (Fig. 67J) and with an acute medio-longitudinal keel in the vertical posterior portion; the posterior margin rounded with the median portion somewhat more deflexed, generally labiate and forming a notable flange (Fig. 67L, 72L).

Legs. – Basically, with armature like in ♀, but relatively longer and slenderer; hind legs projecting considerably over apex of abdomen. Basitarsus slightly longer and slenderer, the pro- and metabasitarsus notably longer than the following three joints combined.

Variability. – While ♂ are fairly homogenous in morphological and chromatic aspects and only range in colour from greenish to rather brownish tones, ♀ show noteworthy variability particularly in the colouration. The range of general colour comprises various tones of light to dark green and olive with pretty brown and blackish mottling, giving the insects a pretty moss-like colour pattern. About 50% of the specimens examined have a variably shaped and sized bright green, smooth medio-anterior marking on abdominal tergum IV (Fig. 67A, C & 68A), which ranges in shape from triangular over roundly trapezoidal to oval, or may even be medially divided into two oval markings. Morphologically slight variability is seen in the development of the head and body armature.

Egg (Fig. 74L-M)

Moderately sized and rather elongate for the genus; capsule barrel-shaped, almost round in cross-section with the polar-area slightly narrowed, almost 1.9x longer than wide. Surface generally smooth but minutely and unevenly pitted; the anterior one-quarter and operculum densely covered with short setae. Micropylar plate large and about 0.6x as long as capsule; median portion rather broad and the two posterolateral extensions very large, strongly up-curved and on lateral surfaces of capsule reaching to anterior one-third of median portion of plate; width of the two lateral extensions roughly equal to median portion; surface pitted like capsule and outer margin somewhat inflated. A deep and fairly narrow indention posteromedially; in its upper end a small bowl-shaped micropylar cup. Median line a weakly indicated bulge that almost reaches to polar area. Operculum almost round and weakly convex. General colour plain greyish mid brown, the setose anterior portion of capsule and operculum dark brown. Measurements [mm]: Length 4.5-4.6, width 2.2-2.3, height 2.5-2.6, length of micropylar plate 2.7-2.8.

Remarks. – Culture stock of this species has been collected on the two volcanoes Kanlaon and Mandalagan by Jeffebeck Arimas in 2006, first reared in by Bruno Kneubühler (Switzerland) and is since being reared in captivity in Europe. It has proven easy to rear in humid conditions and frequently accepts bramble and raspberry (*Rubus* spp., Rosaceae), roses (*Rosa* spp., Rosaceae), hazel (*Corylus avellana*, Betulaceae), oaks (*Quercus* spp., Fagaceae), ivy (*Hedera helix*, Araliaceae), beech (*Fagus sylvatica*, Fagaceae), hazel (*Corylus avellana*, Betulaceae) and hawthorn (*Crategus* spp., Rosaceae) as alternative food-plants.

Distribution. – Negros, endemic.

Trachyaretaon tumandok **n. sp.**

(Fig. 69, 71F-G, 72M & 74P-Q)

ZooBank: https://zoobank.org/3EC48792-F9CE-476B-8129-B9A4FE445579

HT, ♀: Philippinen, Panay Island, Mount Nangtud, 1500 m, leg. N. Mohagan VII.1997 [RBINS, ex coll. FH].

PT, ♂: Philippinen, Panay Island, Mount Nangtud, 1500 m, leg. N. Mohagan VII.1997 [RBINS, ex coll. FH].

PT, **2** eggs: Philippinen, Panay Island, Mount Nangtud, 1500 m, leg. N. Mohagan VII.1997 [RBINS, ex coll. FH].

PT, **5** ♀, **5** ♂, **1** ♀ (juvenile): Philippinen, Panay Island, Mount Nangtud, 1500 m, leg. N. Mohagan VII.1997 [FH, No's 0717-1 to 11].

Differentiation. – This new species is morphologically nearest and apparently most closely related to *T. negrosanon* **n. sp.** from the island of Negros (see above), with which ♀ share the basically greener overall colouration if compared to other congenerics, and with which ♂ have the characteristic black abdominal sterna II-VII in common (Fig. 69F). *Trachyaretaon tumandok* however is much larger than *negrosanon*, has the cephalic and thoracic armature comparatively less developed and the head is less prominently inflated and has the vertex rather rounded and not projecting over the anterior margin of the pronotum (Fig. 69G). Females are slightly stockier in overall shape than those of *negrosanon* and are also separable by the medially notched posterior margin of the anal segment (Fig. 69M) and longer epiproct, which ± reaches to the tip of the subgenital plate (Fig. 69K-M). Males have the pair of black markings on the abdominal terga II-V less pronounced than in *negrosanon*, the mesothorax is relatively longer and 2.6x longer than the prothorax (only 2.25x in *negrosanon*), the antennae are comparatively shorter and reach no further back than abdominal segment VI (to VII in

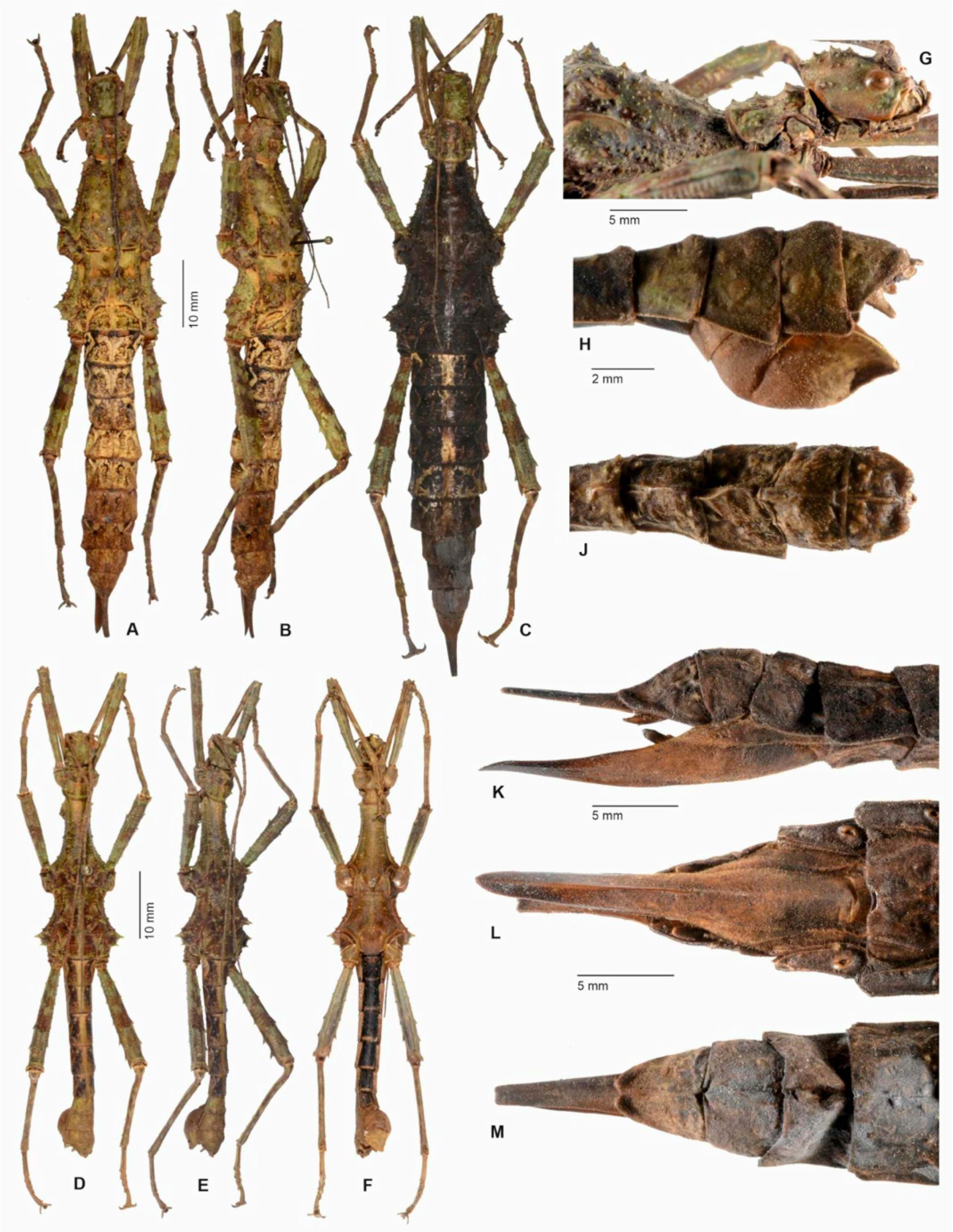

Fig. 69. *Trachyaretaon tumandok* **n. sp.**

– **A**. ♀ paratype, dorsal view [FH 0717-4]. – **B**. ♀ paratype, dorsolateral view [FH 0717-4]. – **C**. ♂ paratype, dorsal view [FH 0717-1]. – **D**. ♂ paratype, dorsal view [FH 0717-9]. – **E**. ♂ paratype, dorsolateral view [FH 0717-9]. – **F**. ♂ paratype, ventral view [FH 0717-9]. – **G**. Head, pro- and mesothorax of ♀ paratype in lateral view [FH 0717-3]. – **H**. Terminalia of ♂ paratype in lateral view [FH 0717-8]. – **J**. Terminalia of ♂ paratype in dorsal view [FH 0717-6]. – **K**. Terminalia of ♀ paratype in lateral view [FH 0717-1]. – **L**. Terminalia of ♀ paratype in ventral view [FH 0717-1]. – **M**. Terminalia of ♀ paratype in dorsal view [FH 0717-4].

negrosanon) and the anal segment (Fig. 69J) is less narrowed towards the posterior, basically broader and has two posterolateral impressions, which are not seen in *negrosanon*. The eggs of this new species (Fig. 74P-Q) resemble those of *T. mangyan* **n. sp.** and *T. negrosanon* **n. sp.** by having a large micropylar plate with strongly elongated and up-curved lateral extensions. They are most similar to those *mangyan* but differ by the dark brown colour, smaller and narrower lateral extensions of the micropylar plate and less numerous and less developed setae in the anterior portion of the capsule and on the operculum.

Etymology. – Named after the Tumandok, also known as Panay-Bukidnon or Suludnon, a culturally indigenous Visayan group of people who live in the mountains of Panay Island, the type-locality of this new species. They are known for their Binanog dance, which mimics the flight of the Philippine eagle, accompanied by an agung ensemble, and practice the use of bamboo musical instruments to express themselves in traditional songs, dances and epics. Since the local governments of Panay have realized their cultural importance, they have begun to establish projects to help preserve their culture.

Description

The colouration of this large and stocky species is described from dried specimens only.

♀ (Fig. 69A-C)

Form and colouration. – Large (body length 91.0-107.0 mm) and stocky for the genus with moderately developed body armature and rather low, but conical and multi-tuberculated posterior meso- and metanotals; body surface sparsely and unevenly tuberculate and with a fine medio-longitudinal carina. General colour variable, mostly various tones of dark green and olive, irregularly flecked with brown, cream and some orange; lateral surfaces of abdominal terga II-VII mostly cream with characteristic blackish mottling that roughly forms a triangle. Two specimens are notably darkened due to preservation but have a light cream-coloured medio-longitudinal streak along the basal four abdominal terga (Fig. 69C). Two faint roughly triangular brown markings present on frons. Eyes dark reddish brown, antennae dark brown.

Head. – Slightly longer than wide with vertex just moderately inflated and rounded, not projecting over anterior margin of pronotum; sparsely set with node-like granules (Fig. 69G). Supra-antennals distinct and acutely pointed; supra-orbitals smaller and rather conical; genae with a few small rather node-like gulars. The four coronals roughly equal in size, strong and conical; two strong supra-orbitals present that are slightly larger than the coronals; anterior portion of vertex with 2-3 pairs of variably sized occipital medials, the most posterior pair of which is most pronounced. Eyes strongly projecting and their diameter contained scarcely less than 2x in length of genae. Antennae with about 28 joints and reaching to posterior margin of abdominal segment II.

Thorax. – Pronotum about as long but slightly wider than head with a distinct median narrowing and the posterior portion notably widened; the transverse median sulcus shallow, gently arched and expanding almost over entire width of segment; surface sparsely and unevenly tuberculated. The prominent and conical pair of posterior pronotals represent the largest of the pronotal spines; anterior portion with a low and obtuse pair of posterior mesal pronotals, the antero-lateral pronotals small and blunt, the inter-posterior pronotals only represented by small tubercles (Fig. 69G). Mesothorax strongly gradually ascendant and widened towards the posterior, shape strongly trapezoidal with posterior margin about 2.2x wider than anterior margin; 2.3x longer than prothorax. Mesonotum also trapezoidal and only with two pairs of small conical post-median mesonotal tubercles (occasionally also a small pair of pre-median tubercles present); posterior mesonotals rather low, conical and multi-tuberculated with a strong and conical median projection (Fig. 69G). Mesopleurae increasingly deflexed towards posterior and with a moderate, strong and conical mesopleural; the antero-lateral, medio-lateral and one of the supra-coxals somewhat enlarged and bluntly spiniform; surface otherwise tuberculated. Metanotum subquadrate with posterior portion somewhat widened, the posterior metanotals like those of the mesonotum and in front with a fairly distinct pair of anterior metanotal tubercles. Metapleural small, the lateral margin unevenly tuberculated and with a strong median supra-coxal; a much smaller supra-coxal present in front and near posterior margin and two slightly enlarged, conical laterals present. Meso- and metasternum with a medio-longitudinal row of irregularly dispersed glossy, node-like granules; mesosternum with six paired rather low but distinct mesosternals and metasternum only with about six small node-like tubercles as well as a somewhat more pronounced median pair posteriorly; general surface otherwise fairly smooth (Fig. 71F).

Abdomen. – Median segment trapezoidal with posteriors only represented by small nodes, surface otherwise only with one or two pairs of node-like medials. Segments II-IV roughly uniform in width V-X narrowing; II-VI scarcely subequal in length and on average about 2.1x wider than long. Lateral margins of terga IV-VII somewhat deflexed and angular posteriorly; surface only with a very indistinct pair of latero-anterior and latero-posterior tubercles. Sterna smooth; praeopercular organ formed by a moderately broad median excavation of posterior margin of sternum VII, which otherwise is slightly raised and rounded on each side of the median excavation. Terga VIII and IX each with low and obtuse posteromedian swelling (Fig. 69K); lateral margins of IX notably deflexed, broadly and obtusely triangular and lobe-like. Anal segment essentially triangular in dorsal aspect, the lateral margins roundly deflexed anteriorly; the anterior two-thirds strongly descendant, the posterior one-third rather horizontal with a distinct and obtuse medio-longitudinal bulge and an impression on each side; the posterior margin notably inflated and weakly notched medially (Fig. 69M). Epiproct straight in lateral aspect (Fig. 69K), about 1.4x longer than anal segment, weakly tectate longitudinally and slightly narrowing towards an obtusely rounded to weakly notched apex (Fig. 69M). Subgenital plate long, lanceolate and distinctly keeled in the apical half; the apex fairly pointed and roughly reaching to tip of epiproct (Fig. 69K-M).

Legs. – Moderately long and slender for the genus, the meso- and metafemora somewhat incrassated subapically. Basal flexure and constriction of profemora weakly developed; the anteroventral carina with two fairly distinct triangular teeth in apical one-third; posteroventral carina only with three slightly indicated teeth; dorsal carinae each with five low teeth that slightly increase in size towards the apex. All four carinae of meso- and metafemora with five teeth that become slightly larger towards the apex of femur; those on the ventral carinae more spiniform; medioventral carina wanting and ventral surface generally smooth. Protibiae wholly unarmed, meso- and metatibiae only with a few small ventral dentations in apical half. Basitarsus about as long as proceeding three joint combined.

♂ (Fig. 69D-F)

Form and colouration. – Size and general form average for the genus (body length 61.0-64.0 mm), body armature rather weakly developed with the posterior meso- and metanotals conical and multi-tuberculose to subspinose; body surface sparsely granulose to tuberculated; dorsal surface with a fine medio-longitudinal carina. Colour essentially similar to ♀ both dorsal body surface with a more or less defined cream-coloured to fawn medio-longitudinal streak and lateral surfaces of abdominal terga II-VI mostly blackish with a semi-circular ochre marginal marking which is most distinct on II; terga VII-X uniformly ochraceous olive. Abdominal sterna II-VI uniformly black, VII dark brown (Fig. 69F).

Head. – Shape and armature essentially as in ♀ but all the spines notably larger and stronger. Eyes relatively much larger, projecting hemispherically and their diameter contained about 2x in length of genae. Antennae like in ♀ but reaching to abdominal segment IV.

Thorax. – Prothorax generally as in ♀ but armature comparatively more pronounced. Mesothorax moderately elongate for the genus being 2.6x longer than the prothorax; anterior two-thirds slender and roughly parallel-sided, posterior portion strongly widened and inflated. Mesonotum unarmed except for fairly distinct, strong, conical and acutely pointed posterior mesonotals, these compound with several smaller spiniform tubercles around the base. Metanotum with a small pair of anterior tubercles, the posterior metanotals generally like those of the mesonotum but slightly larger. Pleurae with armature like in ♀. Meso- and metasternum granulose with a fine medio-longitudinal carina that is set with some glossy granules; mesosternum with six fairly distinct but low and conical paired mesosternals; metasternum only with two tuberculiform metasternals.

Abdomen. – Median segment trapezoidal in outline with lateral margins gently rounded. Segment II trapezoidal, III-V uniform in width, VI slightly shorter and narrower than preceding and VII notably shorter than VI and slightly widening towards posterior; II-IV slightly increasing, V-VII notably decreasing in

	♀, **HT** [RBINS]	♂, **PT**	♀, **PT**
Body	99.0	61.0-64.0	91.0-107.0
Pronotum	7.4	3.9-4.1	6.3-6.8
Mesonotum	15.4	12.0-12.3	15.5-17.3
Metanotum	9.4	6.9-7.1	9.0-10.6
Median segment	5.7	2.9-3.0	3.9-4.7
Profemora	19.2	12.8-13.4	16.5-18.3
Mesofemora	18.4	12.2-13.2	15.4-17.8
Metafemora	21	15.8-16.2	20.3-24.0
Protobiae	19.3	13.2-13.9	17.2-19.0
Mesotibia	16.1	12.0-13.2	15.8-17.7
Metatibia	22.9	17.0-17.5	22.8-25.5
Antennae	-	41.0-43.0	49.0-54.0

Table 12. Measurements of *Trachyaretaon tumandok* **n**. **sp**.

length; IV about 1.3x longer than wide, VII transverse. Terga II-VII unarmed except for somewhat enlarged latero-anterior nodes; VI-IX each with an obtuse posteromedian swelling. Sterna II-VI smooth except for an anterior pair of small nodes on II-IV; VII acutely tectate longitudinally. Lateral margins of VIII and IX notably deflexed, straight. Anal segment notably narrowing towards the posterior, the lateral margins with a small and obtuse dentiform process anteriorly; the posterior margin somewhat inflated, broadly triangularly excavated medially and bi-lobate; dorsally with a shallow oval impression near each outer posterior angle (Fig. 69J). Epiproct small, broadly triangular and scarcely projecting into median excavation of posterior margin of anal segment (Fig. 69J). Vomer rather small, basically triangular in shape with a short terminal hook that is slightly arched towards the right (Fig. 72M). Cerci strongly compressed laterally, small. Poculum large, bulgy, obtusely cup-shaped (Fig. 69H) and with an acute medio-longitudinal keel in the vertical posterior portion; posterior margin rounded with a shallow median indention and weakly labiate (Fig. 72M).

Legs. – Basically, with armature like in ♀, but relatively longer and somewhat slenderer; hind legs projecting considerably over apex of abdomen. Basitarsus slightly longer and slenderer, the pro- and metabasitarsus notably longer than following three joints taken together.

Egg (Fig. 74P-Q)

The only two eggs available are dirty and were mostly covered with undefined tissue. Cleaning was attempted but the contaminations are strongly adhesive and could not be fully removed without risking damage. Thus, only parts of the contaminations could be removed.

Fairly large for the genus; capsule barrel-shaped and 1.9x longer than wide or high. Surface generally smooth but minutely and fairly evenly pitted; the anterior one-quarter and operculum covered with dome very short setae. Micropylar plate large and about 0.65x as long as capsule; median portion rather broad and the two posterolateral extensions large, similar in width to the median portion, strongly up-curved and on lateral surfaces of capsule reaching to anterior one-third of median portion of plate; surface pitted like capsule and outer margin flat. A deep and fairly narrow indention posteromedially; in its upper end a small bowl-shaped micropylar cup. Median line a weakly indicated carina that almost reaches to polar area. Operculum almost round and roundly convex. General colour plain dark ochraceous brown, the setose anterior portion of capsule and operculum darker brown. Measurements [mm]: Length 4.6, width 2.5, height 2.6, length of micropylar plate 3.0.

Variability. – The type-series merely shows minor variability in the colouration and development of the body sculpturing and armature, most of which is mentioned in the description above.

Distribution. – Panay, endemic.

Rearing

Most members of Obrimini are easily reared in captivity and feed on a variety of alternative food plants. During the past fifteen years more than twenty species species, comprising representatives of all Philippine genera with the exception of *Armadolides* **n**. **gen**. and *Theramenes*, have been successfully reared in captivity in Europe and most cultures are still being maintained in culture. Quite frequently new culture stocks are being introduced and species such as *Aretaon asperrimus*, *Brasidas cavernosus*, the spiny *Tisamenus serratorius*, *Sungaya ibaloi* **n**. **sp**. (previously referred to as *Sungaya inexpectata* 'highland') or the very colourful *Mearnsiana bullosa* are among the most commonly reared phasmid species. The stocky shape, often spectacular spination and pretty colour varieties of the majority of species are surely some of the main reasons, why obriminoids have become so popular among phasmid enthusiasts. A plethora of papers have since dealt with the captive breeding, biology, life-cycle, habits and origins of culture stocks of various species or have provided summaries of species of certain genera (Bresseel, 2009; Krijns, 2012; Harman, 2013a, 2013b; 2015 & 2022; Dräger, 2012, 2013 & 2014). In general, there are standard conditions for breeding Obrimini successfully in captivity, since most species originate from similar natural habitats and share similar climatic preferences and habits, such as the egg laying technique described above. According to the size of the individual species small to medium plastic or glass terrariums are suitable and since most species prefer high humidity, little ventilation is needed and the insects should regularly be sprayed with water. The terrarium should have a several centimetre thick bottom layer of substrate or contain a plastic container filled with vermiculite, peat or sand for oviposition. Some species also prefer moss for oviposition, which can be placed on the floor or in corners of the terrarium. Most species prefer to rest on the ground or hide in hollows during the day, why a layer of foliage or pieces of cork bark or mossy stems should be provided. Eggs can either be left in the bottom layer of substrate of the breeding terrarium or can be transferred to separate containers for incubations but need to be buried and kept humid. Hatching rates are usually quite high and the hatchlings are sturdy with only little losses throughout the nymphal development. Most species appear to be rather polyphagous and feed on a variety of different alternative plants in captivity. From the species reared in captivity in Europe only *Stenobrimus bolivari* has proven to be a specialized fern-eater (Polypodiaceae), which however corresponds to the host plant preferences in its natural habitats Zompro, 1996b: 455). Alternative food plants commonly accepted in captivity in Europe by most species of Obrimini include numerous Rosaceae such as bramble (*Rubus fruticosus*), raspberry (*Rubus idaeus*), roses (*Rosa* spp.), pyracantha (*Pyracantha coccinea*) or hawthorn (*Crataegus monogyna*) but also plants from various other families including hazel (*Corylus avellana*, Betulaceae), oaks (*Quercus* spp., Fagaceae), beech (*Fagus sylvatica*, Fagaceae), guava (*Psidium guayava*, Myrtaceae), ivy (*Hedera helix*, Araliaceae) or different Araceae (e.g. *Epipremnum* spp. or *Syngonium* spp.).

Summary & discussion

The present paper has provided a taxonomic review of the Philippine members of the Heteropteryginae tribe Obrimini and all genera with the exception of *Tisamenus* Stål, 1875 have been covered in more or less detail. A recent molecular study of the Heteropterygidae by Bank *et al.* (2021) has supported the assumption that the Obrimini in particular still comprise numerous new species, some of which have morphologically been difficult to confine from closely related species. The intra-generic relationships within the Obriminae and the tribe Obrimini have been treated somewhat controversially in the past (Zompro, 2004; Hennemann *et al.*, 2016; Bank *et al.*, 2021) and the delimitation of Obrimini is here reflected as arranged by Bank *et al.* (2021). While the morphological approach by Hennemann *et al.* (2016) and the molecular study by Bank *et al.* (2021) are in accordance in most aspects, only the topology is different. Whereas the genus *Tisamenus* is regarded as sister to all remaining Obrimini and the genus *Miroceramia* is contained within Obrimini by Bank *et al.* (2021), these two genera have been placed in two separate tribes, the Tisamenini and Miroceramiini, by Hennemann *et al.* (2016) with Tisamenini sister to Obrimini + Miroceramiini, Consequently, these two tribes are now regarded as synonyms of Obrimini.

The present paper has focussed on reviewing the genera and species of Philippine Obrimini, revealing intraspecific variability which has resulted in the description of new species, new synonymy, and revealed previously unknown sexes and eggs as well as presenting numerous new records of various species to broaden our knowledge on the geographic distributions of genera and species. The eighteen new species described herein represent about 27% of the current known diversity of the tribe Obrimini and constitute a noteworthy enhancement of our knowledge of the diversity of this clade in the Philippines. Moreover, they clearly demonstrate our still fractional knowledge of the true diversity of the striking Obrimini stick insects. The author is aware of several further new species of the tribe Obrimini. Some of these are currently only available from unique specimens, some of which are from questionable localities, and belong into genera such as *Brasidas*, *Obrimus* or *Trachyaretaon*, which comprise several morphologically very similar species. Thus, more specimens are needed for confirming these from closely related species. Others are only known from photographs, like the spectacularly coloured male of a new *Brasidas*-species from Mount Hamiguitan Wildlife Sanctuary, Davao Oriental Province, E-Mindanao shown in figure 23E. A remarkably stocky and spinose new species of *Sungaya* from Baguio, Benguet Province, Luzon was examined from pictures taken by Adryn A. Nebrida and is believed to be in description. Also, the speciose genus *Tisamenus*, which is not covered herein, has several potentially new species which are hoped to be described in the near future.

In general, it is known that still a plethora of new species of Phasmatodea from throughout the Philippines await formal description, many of which are endemics of individual islands or certain isolated habitats on islands. The impressive biodiversity of Philippine Phasmatodea however, is badly threatened by an increasing destruction and loss of forest, which becomes obvious by some very alarming figures. From 2002 to 2021, the Philippines lost 158kha of humid primary forest, making up 12% of its total tree cover loss and the total area of humid primary forest in the Philippines decreased by 3.4% in this time period of less than twenty years. About 92% of this loss occurred in areas where the main reason is deforestation by human (Source: https://globalforestwatch.org, accessed 20.05.2023). Since small and isolated island faunas are particularly vulnerable, why such massive degrees of deforestation have severe impact on the biodiversity. It is known that protected forests experience the lowest deforestation and thus it must be hoped that there will rapidly be efforts to protect the remaining forest areas of the Philippines to help retain as much as possible of the highly threatened endemic biodiversity of the archipelago. Therefore, it is hoped that the description of new species of stick-insects will support considerations that ensure the survival and protection of endangered areas within the Philippines.

The Obrimini clade is principally of Philippine origin where it has predominantly radiated with only few representatives known from outside the Philippines (Hennemann *et al.*, 2016: 109; Bank *et al.*, 2021). Eleven of the 14 known genera of Obrimini are found in the Philippines and nine of these are endemic to the archipelago. Only *Aretaon* and *Theramenes* have species in and outside the Philippines. *Aretaon* comprises two species, both of which are found on the island of Borneo, but *Aretaon asperrimus* (Redtenbacher, 1906) is also represented on Palawan. In aspect of the fact that *Aretaon* is the sister-taxon of the exclusively Philippine *Trachyaretaon* (Bank *et al.*, 2021) a Philippine origin must be estimated for the genus. The distinctive genus *Theramenes* has four species in the southern Philippines (Hennemann, 2023) but also one species on the Talaud islands, which are situated between Mindanao in the north and Sulawesi in the south. The presence of *Th. olivaceus* (Westwood, 1859) on these small islands may be explained by an accretion of terranes and volcano islands perhaps during the early Pliocene, which created a hypothetical panbiographic track line formed by island chain bridges between Mindanao and northern Sulawesi (Vallejo, 2011: 38, fig. 6; Hennemann *et al.*, 2016: 109). A satisfactory reconstruction of the radiation and track lines of Obrimini within the Philippines, however, is mainly hindered by the very complex geography and geology of this large archipelago. Basically however, a northward and north-westward dispersal can be estimated, which started in western Mindanao and continued to Luzon and to the smaller western Visayas later on (Vallejo, 2011: 27). Based on a wide array of molecular data Bank *et al.* (2021: 16) have hypothesized a single invasion of the Philippine Islands by ancestors of the Obriminae clade and a general distributional pattern from South to North among most lineages as well as at least two secondary invasions to the South. The diversification of most lineages and dispersal among the archipelago is believed to have most likely occurred not earlier than during the low seal-levels in the Pliocene and Pleistocene. Still however, any more comprehensive discussion on the dispersal of Obrimini throughout the complex Philippine archipelago warrants much more data and confirmed information on the tectonic history and geology of the Philippines.

Although many species of Obrimini are being reared in captivity and have become popular with phasmid enthusiasts throughout Europe, very little is known about the natural habits and host plants of these insects. Members of the tribe have settled a wide range of different habitats throughout the Philippines, that range from coastal or coastal near dry forests, humid lowland forests and montane forests up to altitudes of 2000 metres. Almost all taxa, but those of *Tisamenus* in particular, are not truly ground dwelling as often wrongly stated (e. g. Bank *et al.*, 2021), but live within ground near or low vegetation in their habitats usually below 2 metres off the ground. Only *Mearnsiana* is known to have arboreal habits and is frequently found more high-up in shrubs or small trees (personal communication with Joachim Bresseel, April 2023). All members of Obrimini however share the same derived egg-laying strategy, with ♀ descending from their host plants during the night and using their beak-like ovipositor to bury the eggs in a suitable substrate.

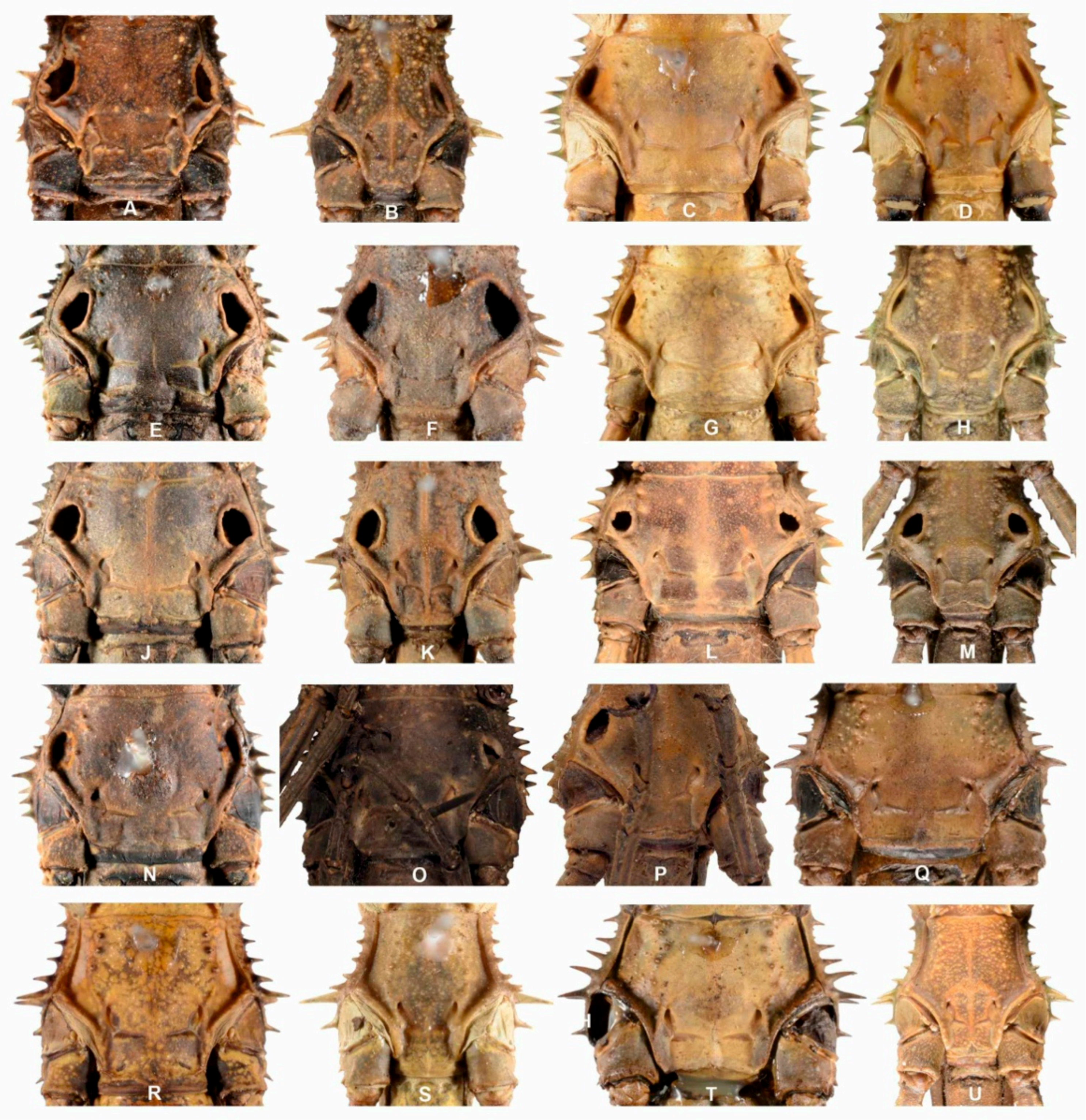

Fig. 70. Metasternum with foramina.

– **A**. *Brasidas bakeri* (Rehn & Rehn, 1939) ♀. – **B**. *Brasidas bakeri* (Rehn & Rehn, 1939) ♂. – **C**. *Brasidas cavernosus* (Stål, 1877) ♀. – **D**. *Brasidas cavernosus* (Stål, 1877) ♂. – **E**. *Brasidas lacerta* (Redtenbacher, 1906) ♀. – **F**. *Brasidas lacerta* (Redtenbacher, 1906 ♂. – **G**. *Brasidas samarensis* Rehn & Rehn, 1939 ♀. – **H**. *Brasidas samarensis* Rehn & Rehn, 1939 ♂. – **J**. *Brasidas viscayanus* Rehn & Rehn, 1939 ♀. – **K**. *Brasidas viscayanus* Rehn & Rehn, 1939 ♂. – **L**. *Brasidas manobo* **n**. **sp**. ♀ (holotype). – **M**. *Brasidas manobo* **n**. **sp**. ♂ (paratype). – **N**. *Brasidas waray* **n**. **sp**. ♀ (holotype). – **O**. *Brasidas rehni* **n**. **sp**. ♀ (holotype) [© Jason Weintraub, ANSP]. – **P**. *Brasidas rehni* **n**. **sp**. ♀ (paratype) [© Jason Weintraub, ANSP]. – **Q**. *Obrimus uichancoi* Rehn & Rehn, 1939 ♀. – **R**. *Obrimus bicolanus* Rehn & Rehn, 1939 ♀. – **S**. *Obrimus bicolanus* Rehn & Rehn, 1939 ♂. – **T**. *Obrimus bufo* (Westwood, 1859) ♀. – **U**. *Obrimus bufo* (Westwood, 1859) ♂.

List of new taxa

Armadolides **n. gen.** [Mindanao]
Brasidas malaki **n. sp.** [Leyte]
Brasidas manobo **n. sp.** [Mindanao]
Brasidas rehni **n. sp.** [Siargao]
Brasidas waray **n. sp.** [Leyte]
Eubulides blaan **n. sp.** [Mindanao]
Eubulides constanti **n. sp.** [Mindanao]
Eubulides lumawigi **n. sp.** [Luzon]
Eubulides timog **n. sp.** [Luzon]
Mearnsiana maranao **n. sp.** [Mindanao]
Sungaya aeta **n. sp.** [Luzon]
Sungaya dumagat **n. sp.** [Luzon]
Sungaya ibaloi **n. sp.** [Luzon]
Trachyaretaon bresseeli **n. sp.** [Luzon]
Trachyaretaon maliit **n. sp.** [Luzon]
Trachyaretaon mangyan **n. sp.** [Mindoro]
Trachyaretaon nakatago **n. sp.** [Luzon]
Trachyaretaon negrosanon **n. sp.** [Negros]
Trachyaretaon tumandok **n. sp.** [Panay]

Checklist of Philippine Obrimini

The following is an alphabetical checklist of all known Philippine genera and species of Obrimini, including the taxonomic changes conducted in the present work. Up to date valid 66 species are known, which belong into eleven genera, the most speciose of which is *Tisamenus* Stål, 1875. This latter genus is not handled herein and shall be subject to a separate forthcoming study because there appear to several still undetected synonymies that deserve detailed depiction based on a big amount of material and would have exceeded the scope of the present work.

Aretaon Rehn & Rehn, 1939
- *Aretaon asperrimus* (Redtenbacher, 1906)

Armadolides **n. gen.**
- *Armadolides manobo* (Acola, Naredo & Eusebio, 2022) **n. comb.**

Brasidas Rehn & Rehn, 1939
= *Euobrimus* Rehn & Rehn, 1939 **n. syn.**
- *Brasidas bakeri* (Rehn & Rehn, 1939) **n. comb.**
- *Brasidas cavernosus* (Stål, 1877) **n. comb.**
- *Brasidas foveolatus* (Redtenbacher, 1906) **n. comb.**
- *Brasidas lacerta* (Redtenbacher, 1906). **n. comb.**
  - = *Brasidas acanthoderus* Rehn & Rehn, 1939 **n. syn.**
  - = *Euobrimus atherura* Rehn & Rehn, 1939 **n. syn.**
  - = *Euobrimus cleggi* Rehn & Rehn, 1939 **n. syn.**
  - = *Euobrimus dohrni* Rehn & Rehn, 1939 **n. syn.**
  - = *Brasidas foveolatus asper* Rehn & Rehn, 1939 **n. syn.**
  - = *Brasidas montivagus* Rehn & Rehn, 1939 **n. syn.**
  - = *Euobrimus stephenreyesi* Lit & Eusebio, 2006 **n. syn.**
- *Brasidas malaki* **n. sp.**
- *Brasidas manobo* **n. sp.**
- *Brasidas rehni* **n. sp.**
- *Brasidas samarensis* Rehn & Rehn, 1939
- *Brasidas viscayanus* Rehn & Rehn, 1939
- *Brasidas waray* **n. sp.**

Eubulides Stål, 1877
- *Eubulides alutaceus* Stål, 1877
- *Eubulides blaan* **n. sp.**
- *Eubulides constanti* **n. sp.**
- *Eubulides igorrote* Rehn & Rehn, 1939
- *Eubulides lumawigi* **n. sp.**
- *Eubulides taylori* Rehn & Rehn, 1939
- *Eubulides timog* **n. sp.**

Mearnsiana Rehn & Rehn, 1939
- *Mearnsiana bullosa* Rehn & Rehn, 1939
  - = *Hennobrimus hennemanni* Conle, 2006
- *Mearnsiana maranao* **n. sp.**

Obrimus Stål, 1875
- *Obrimus bicolanus* Rehn & Rehn, 1939
- *Obrimus bufo* (Westwood, 1848)
- *Obrimus mesoplatus* (Westwood, 1848).
- *Obrimus quadratipes* Bolívar, 1890. **rev. comb.**
- *Obrimus uichancoi* Rehn & Rehn, 1939

Stenobrimus Redtenbacher, 1906
- *Stenobrimus bolivari* Redtenbacher, 1906
- *Stenobrimus lumad* Lit & Eusebio, 2010
- *Stenobrimus pilipinus* Eusebio, Lit & Lucañas, 2023
- *Obrimus tagalog* Rehn & Rehn, 1939

Sungaya Zompro, 1996
- *Sungaya aeta* **n. sp.**
- *Sungaya dumagat* **n. sp.**
- *Sungaya ibaloi* **n. sp.**
- *Sungaya inexpectata* Zompro, 1996

Theramenes Stål, 1875
- *Theramenes dromedarius* Stål, 1877
- *Theramenes exiguus* Hennemann & Conle, 2003
- *Theramenes letiranti* Hennemann, 2023
- *Theramenes mandirigma* Zompro & Eusebio, 2001

Tisamenus Stål, 1875
= *Ilocano* Rehn & Rehn, 1939
- *Tisamenus alviolanus* Lit & Eusebio, 2010
- *Tisamenus armadillo* Redtenbbacher, 1906)
- *Tiasmenus asper* Bolívar, 1890
- *Tisamenus atropos* (Rehn & Rehn, 1939)
- *Tisamenes cervicornis* Bolívar, 1890
- *Tisamenus clotho* (Rehn & Rehn, 1939)
- *Tisamenus deplanatus* (Westwood, 1848)
- *Tisamenus draconina* (Westwood, 1848)
- *Tisamenus fraterculata* (Rehn & Rehn, 1939)
- *Tisamenus hebardi* (Rehn & Rehn, 1939)
- *Tisamenus hystrix* (Rehn & Rehn, 1939)
- *Tisamenus kalahani* Lit & Eusebio, 2005
- *Tisamenus lachesis* (Rehn & Rehn, 1939)
- *Tisamenus polillo* (Rehn & Rehn, 1939)
- *Tisamenus ranarius* (Westwood, 1859)
- *Tisamenus serratorius* Stål, 1875
- *Tisamenus spadix* (Rehn & Rehn, 1939)
- *Tisamenus summaleonilae* Lit & Eusebio, 2005
- *Tisamenus tagalog* (Rehn & Rehn, 1939)

Trachyaretaon Rehn & Rehn, 1939
- *Trachyaretaon bresseeli* **n. sp.**
- *Trachyaretaon carmelae* Lit & Eusebio, 2005
  - = *Trachyaretaon brueckneri* Hennemann & Conle, 2006. **n. syn.**
- *Trachyaretaon echinatus* (Stål, 1877)
- *Trachyaretaon gatla* Zompro, 2004
- *Trachyaretaon maliit* **n. sp.**
- *Trachyaretaon mangyan* **n. sp.**
- *Trachyaretaon nakatago* **n. sp.**
- *Trachyaretaon negrosanon* **n. sp.**
- *Trachyaretaon tumandok* **n. sp.**

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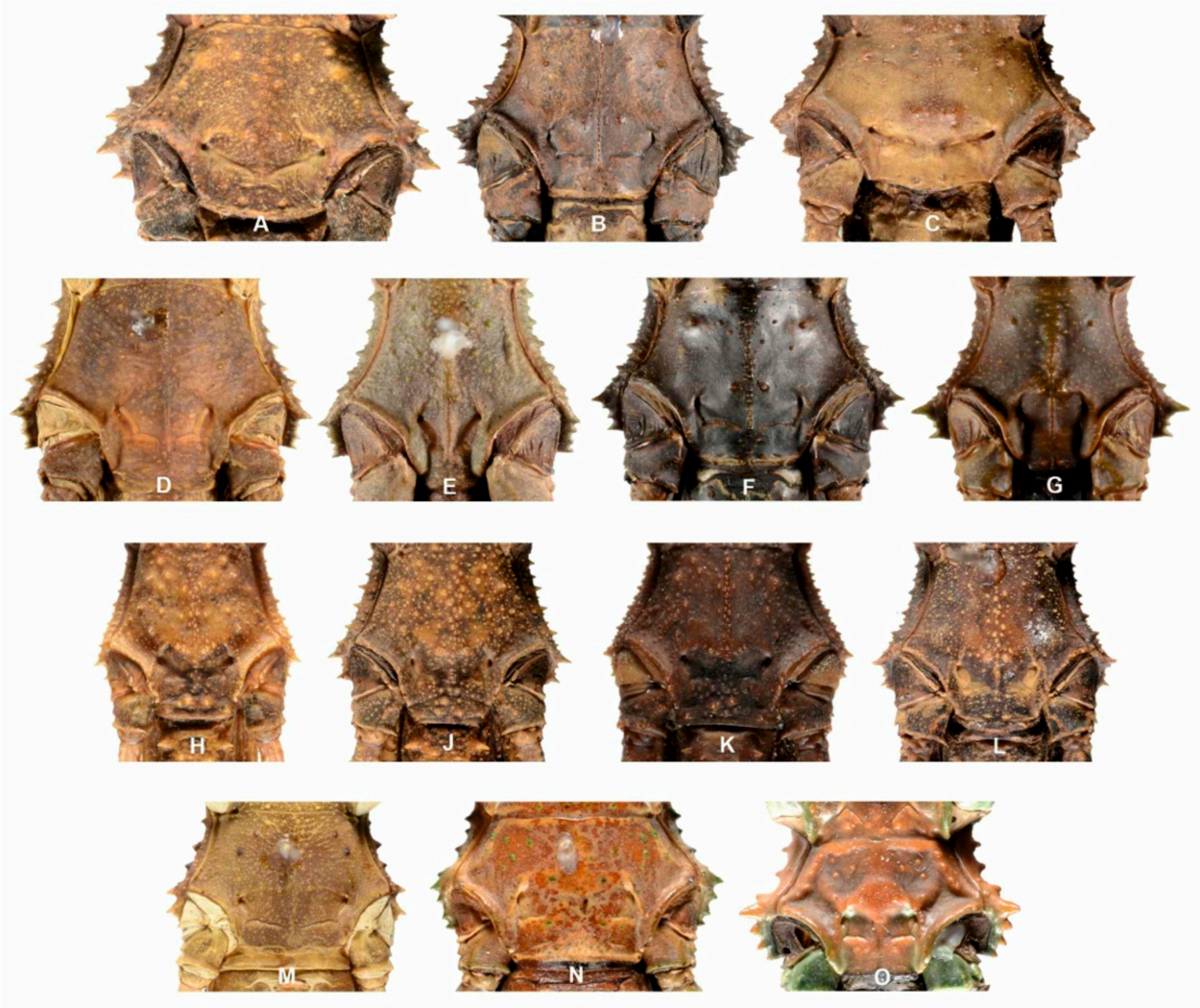

Fig. 71. Metasternum without foramina.

– **A**. *Trachyaretaon echinatus* (Stål, 1877) ♀. – **B**. *Trachyaretaon mangyan* **n**. **sp**. ♀ (paratype). – **C**. *Trachyaretaon maliit* **n**. **sp**. ♀ (holotype). – **D**. *Trachyaretaon carmelae* Lit & Eusebio, 2005 ♀. – **E**. *Trachyaretaon carmelae* Lit & Eusebio, 2005 ♂. – **F**. *Trachyaretaon tumandok* **n**. **sp**. ♀. – **G**. *Trachyaretaon tumandok* **n**. **sp**. ♂. – **H**. *Sungaya inexpectata* Zompro, 1996 ♀. – **J**. *Sungaya dumagat* **n**. **sp**. ♀ (holotype). – **K**. *Sungaya ibaloi* **n**. **sp**. ♀ (paratype). – **L**. *Sungaya aeta* **n**. **sp**. ♀ (holotype). – **M**. *Aretaon asperrimus* (Redtenbacher, 1906) ♀. – **N**. *Mearnsiana bullosa* Rehn & Rehn, 1939 ♀. – **O**. *Mearnsiana maranao* **n**. **sp**. ♂ (holotype).

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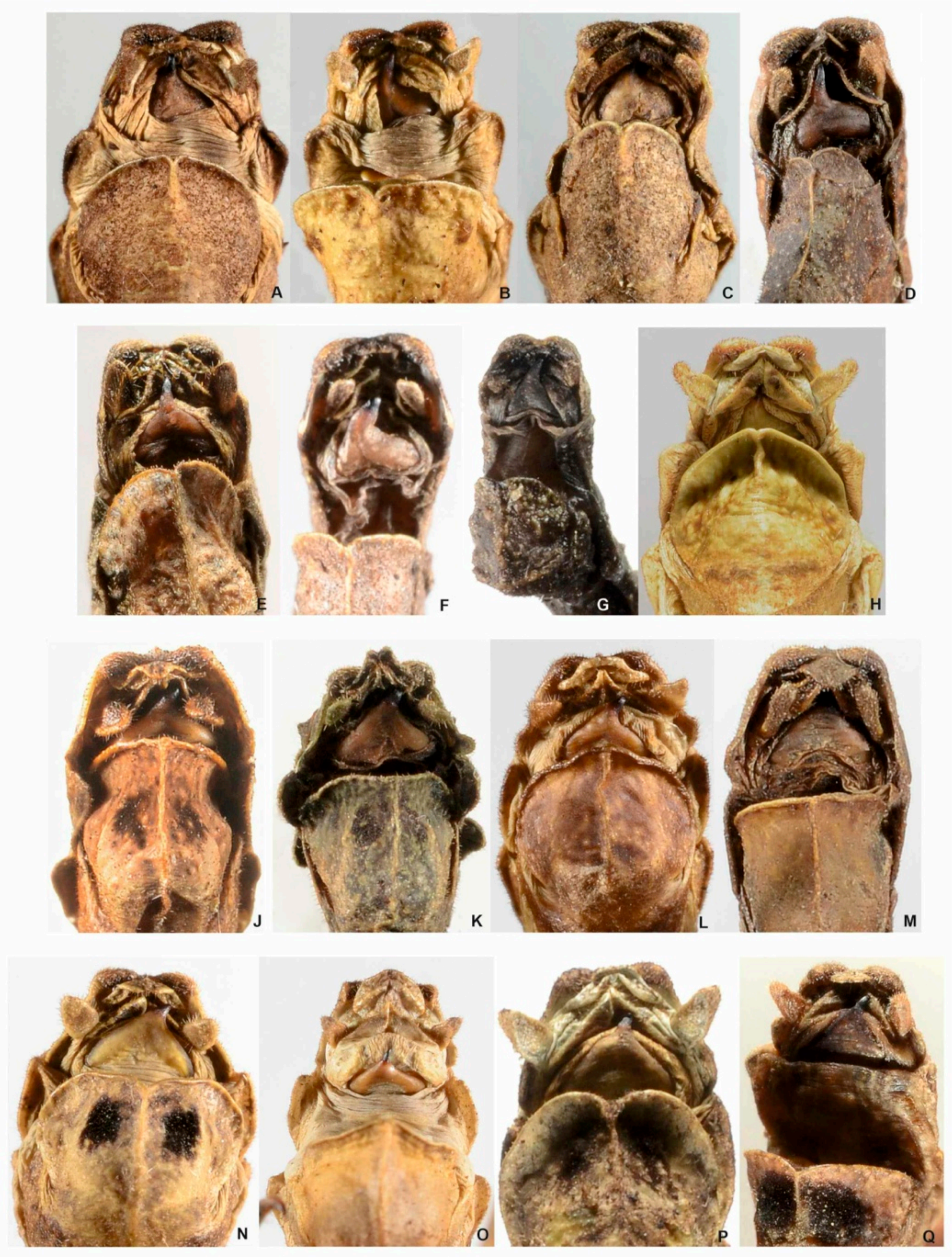

Fig. 72. Vomer of ♂.

– **A**. *Brasidas cavernosus* (Stål, 1877). – **B**. *Brasidas lacerta* (Redtenbacher, 1906). – **C**. *Brasidas samarensis* Rehn & Rehn, 1939. – **D**. *Brasidas viscayanus* Rehn & Rehn, 1939. – **E**. *Eubulides blaan* **n**. **sp**. (paratype). – **F**. *Eubulides timog* **n**. **sp**. (paratype). – **G**. *Armadolides* **gen**. **n**. *manobo* (Acedo *et al*., 2022). – **H**. *Obrimus bicolanus* Rehn & Rehn, 1939. – **J**. *Trachyaretaon echinatus* (Stål, 1877). – **K**. *Trachyaretaon maliit* **n**. **sp**. (paratype). – **L**. *Trachyaretaon negrosanon* **n**. **sp**. (paratype). – **M**. *Trachyaretaon tumandok* **n**. **sp**. (paratype). – **N**. *Trachyaretaon bresseeli* **n**. **sp**. (paratype). – **O**. *Aretaon asperrimus* (Redtenbacher, 1906). – **P**. *Sungaya aeta* **n**. **sp**. (paratype). – **Q**. *Sungaya ibaloi* **n**. **sp**. (paratype).

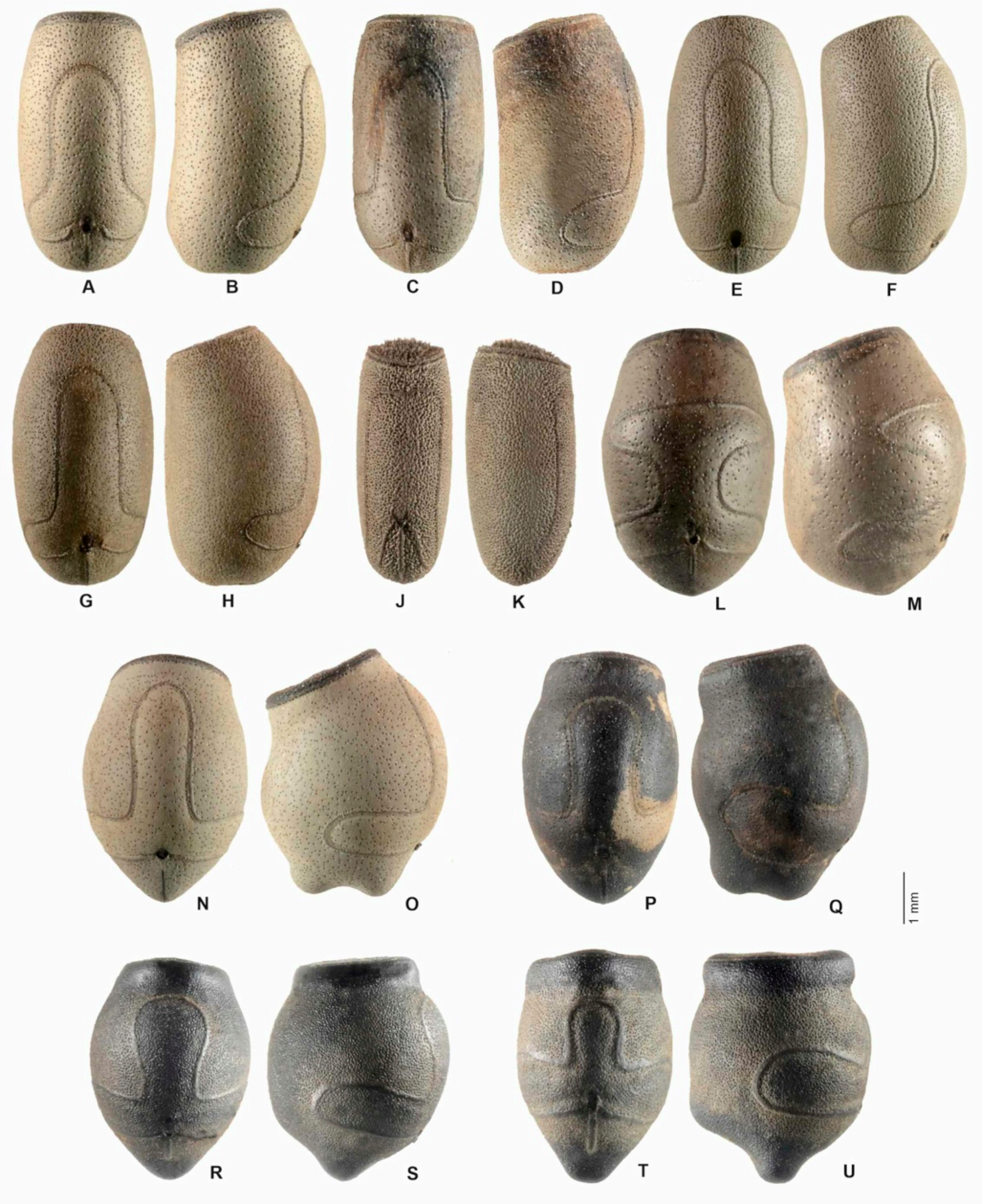

Fig. **73**. Eggs, dorsal view (left) and lateral view (right).

A-**B**. *Brasidas lacerta* (Redtenbacher, 1906). **C**-**D**. *Brasidas bakeri* Rehn & Rehn, 1939. **E**-**F**. *Brasidas cavernosus* (Stål, 1877). **G**-**H**. *Brasidas samarensis* Rehn & Rehn, 1939. **J**-**K**. *Eubulides timog* **n**. **sp**. (paratype). **L**-**M**. *Mearnsiana bullosa* Rehn & Rehn, 1939. **N**-**O**. *Obrimus bicolanus* Rehn & Rehn, 1939. **P**-**Q**. *Obrimus bufo* (Westwood, 1859). **R**-**S**. *Sungaya aeta* **n**. **sp**. (paratype). **T**-**U**. *Sungaya ibaloi* **n**. **sp**. (paratype).

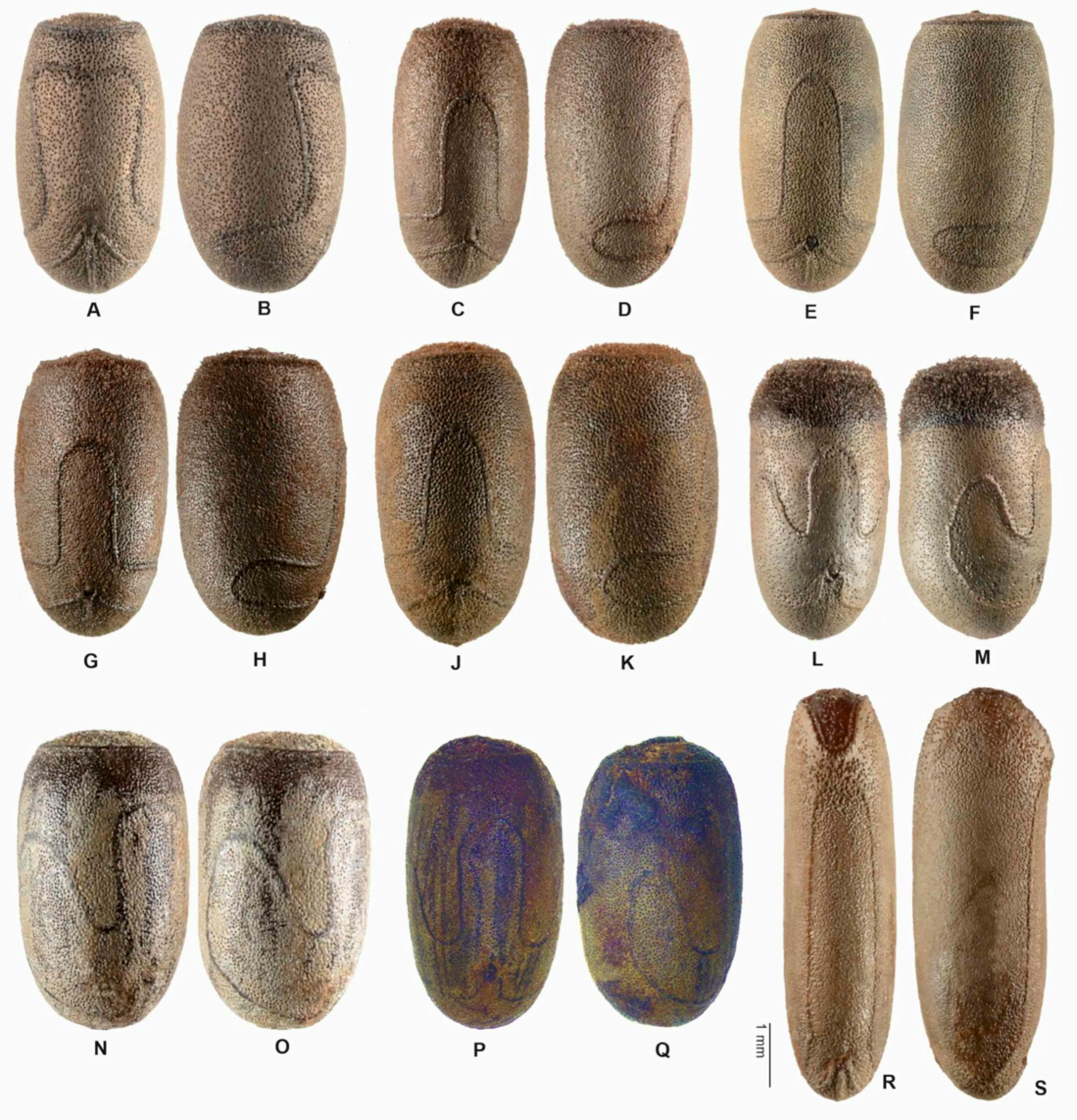

Fig. 74. Eggs, dorsal view (left) and lateral view (right).

A-**B**. *Aretaon asperrimus* (Redtenbacher, 1906). **C**-**D**. *Trachyaretaon echinatus* (Stål, 1877). **E**-**F**. *Trachyaretaon carmelae* Lit & Eusebio, 2005. **G**-**H**. *Trachyaretaon bresseeli* **n**. **sp**. (paratype). **J**-**K**. *Trachyaretaon nakatago* **n**. **sp**. (paratype). **L**-**M**. *Trachyaretaon negrosanon* **n**. **sp**. (paratype). **N**-**O**. *Trachyaretaon mangyan* **n**. **sp**. (paratype). **P**-**Q**. *Trachyaretaon tumandok* **n**. **sp**. (paratype). **R**-**S**. *Theramenes exiguus* Hennemann & Conle, 2003 (paratype).

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Résumé

Hennemann F. H., 2023. – Révision taxonomique des phasmes Obrimini philippins (Insecta : Phasmatodea : Heteropterygidae : Obriminae). *Faunitaxys*, 11(71): 1 – 135

Une révision taxonomique des phasmes des Philippines appartenant à la sous-famille des Obriminae (famille des Heteropterygidae) est menée. Neuf nouvelles synonymies sont révélées. Dix-huit nouvelles espèces et un nouveau genre sont décrits : *Armadolides* **n. gen.**, *Brasidas malaki* **n. sp.**, *B. manobo* **n. sp.**, *B. rehni* **n. sp.**, *B. waray* **n. sp.**, *Eubulides blaan* **n. sp.**, *E. constanti* **n. sp.**, *E. lumawigi* **n. sp.**, *E. timog* **n. sp.**, *Mearnsiana maranao* **n. sp.**, *Sungaya aeta* **n. sp.**, *S. dumagat* **n. sp.**, *S. ibaloi* **n. sp.**, *Trachyaretaon bresseeli* **n. sp.**, *T. maliit* **n. sp.**, *T. mangyan* **n. sp.**, *T. nakatago* **n. sp.**, *T. negrosanon* **n. sp.**, *T. tumandok* **n. sp**.

Mots-clés. – Phasmida, Areolatae, Obriminae, *Aretaon*, *Armadolides* **n. gen.**, *Brasidas*, *Eubulides*, *Euobrimus*, *Mearnsiana*, *Stenobrimus*, *Sungaya*, *Trachyaretaon*, nouveau genre, nouvelle espèce, nouveaux synonymes, clés, descriptions, Philippines, lectotypes.

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A taxonomic review, including new species and new records of Philippine Obrimini stick insects (Insecta: Phasmatodea: Heteropterygidae: Obriminae).

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Illustration de la couverture : oeufs.

Haut gauche : *Obrimus bicolanus* Rehn & Rehn, 1939.
Haut droit : *Trachyaretaon negrosanon* **n**. **sp**. (paratype).
Bas gauche : *Theramenes exiguus* Hennemann & Conle, 2003 (paratype).
Bas droit : *Sungaya ibaloi* **n**. **sp**. (paratype).

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